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ABSTRACT

This handbook provides potential users of the Australian Science Teacher Education Project (ASTEP) units with information gathered from other teacher educators who evaluated the units as part of field trials. The data, presented in graphical form when possible, are divided into three sections: (1) summary of evaluator's responses to individual units, (2) comparison of units in terms of evaluator's responses to particular questions, and (3) directory of stated objectives for ASTEP units. The evaluation questionnaire is included as an appendix. (MH)

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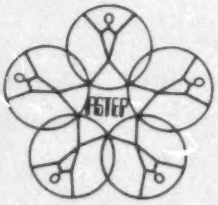

A Project in Teacher Education

EVALUATION HANDBOOK

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INTRODUCTION

From the very beginnings of ASTEP, it was recognized that the development of units for use by teacher educators should be supported by a systematic evaluation programme. The success or otherwise of the project will ultimately be judged in two ways:

(i) by the extent to which the project materials are used in teacher training. and the extent to which the ideas and approaches in the materials are incorporated into teacher training programmes; and,

(ii) in terms of the effectiveness (both real and perceived) of the materials in attaining worthwhile objectives in teacher training.

These dual criteria of acceptability and effectiveness formed the basis of the programme of evaluation of ASTEP trial materials.

During the field trials of ASTEP trial materials, a systematic programme was mounted to gather information by way of evaluation questionnaires from five distinct sources:

- tutors who had used the trial materials with their students;
- student teachers who had taken part in the field testing of trial materials;
- armchair evaluators;
- practising science teachers who had taken part in field trials of materials during in-service courses; and,
- 'experts' in the subject matter of the unit who were asked to comment on the content of units or the approach used.

A high level of consistency of the information on units gathered from the various sources has been demonstrated in subsequent analyses (Mackay and Northfield 1975). A more detailed description of the data gathered from these sources, and the way in which information was obtained is provided in Appendix 2 of ASTEP : A Project in Teacher Education.

The primary purpose for the collection of evaluative information on ASTEP trial materials was the provision of feedback to the authors of the units, and ultimately the editors of the final materials to assist them in their attempts to ensure the effectiveness, usefulness and acceptability of the published units. The final published materials bear the unmistakable imprint of the utilization of this evaluative information.

A second use for the evaluative data was in producing this Evaluation Handbook to accompany the published units. This Handbook is intended to assist tutors in making their own personal evaluation of the effectiveness of a particular unit and in their decision as to whether or not they will incorporate the unit in their teacher education programme. This information is intended to supplement the tutor's own armchair evaluation of the materials with the accumulated opinions of other teacher educators, and at the same time to enable him to draw on the accumulated experience of those who utilized the materials during the field trials.

One shortcoming in the data presented in this Handbook must be recognized. The evaluation reports in this Handbook are based on the trial ASTEP materials, and these materials were subsequently modified to produce the final published units taking cognizance of the evaluation data. This is an example of the classic dilemma faced by all evaluators. If the evaluator produces formative evaluation data which is effective in that it is used as the basis for modifying trial materials to overcome deficiencies identified in these trial materials and to capitalise on the strengths that emerged, the evaluation data gathered is less effective as a summative evaluation of the materials, because the trial materials and the final published materials are not identical. Nevertheless, the final published materials are sufficiently like the trial materials that the data gathered on the trial materials is likely to be a good approximation to data that would be obtained for the final published materials.

It will clearly be desirable in the future to compile a modified Evaluation Handbook based on the final published version of the materials, and funds are being sought for this purpose.

ORGANISATION OF THIS HANDBOOK

The primary purpose for preparing this Handbook was to provide potential users of ASTEP units with information gathered from other teacher educators who had evaluated the units as part of the field trials. Every effort has been made to present the data in forms which can be readily interpreted, and in particular in graphical form.

The data is presented in three sections:

Section 1. Summary of Evaluators' Responses to Individual Units

Section 2. Comparison of Units in terms of Evaluators' Responses to particular Questions

Section 3. Directory of Stated Objectives for ASTEP Units

The purposes of each of these three sections are explained in the introduction which accompanies each of the sections, and the reader is advised to read each of these introductions to become familiar with the range of information available, its limitations and the purposes for its presentation.

ACKNOWLEDGEMENTS

In planning and carrying out the evaluation programme, I drew heavily on my experience in Leicester in 1972 when I had the privilege of working with the S.T.E.P. team and in particular with Clive Sutton, John Hayson, Derek Holford and Mike Graham. I would like to thank Peter Fensham and Denis Driscoll for their invitation to participate in the evaluation of the ASTEP materials, which proved to be such a fascinating task. The evaluation programme would not have been possible without the assistance of Jeff Northfield and Judy Driscoll in the preparation and the distribution of evaluation questionnaires respectively, or the financial support from the Myer Foundation and the Australian Advisory Committee for Research and Development in Education.

Finally, this Evaluation Handbook could not have been compiled without the co-operation of the many educators who so readily provided evaluative information on the field trials of ASTEP materials, or who undertook armchair evaluation of trial materials. It is to be hoped that this Handbook does justice to their enthusiasm and their willingness to share their experiences and opinions.

SECTION 1: SUMMARY OF EVALUATORS' RESPONSES ON INDIVIDUAL UNITS

Introduction

In this section, a summary of the evaluation data on individual units is presented unit by unit. The form of presentation adopted is illustrated on page 5 which explains the format of the data on each unit. A standard form of presentation has been adopted for each unit in an endeavour to facilitate interpretation of the data.

The data summary on a particular unit provides the user with a summary of evaluators' views in the following areas:

- extent to which the unit is likely to promote student teacher attainment of its ascribed objectives;
- extent to which the unit is likely to motivate student teachers;
- extent to which the unit is likely to contribute to the satisfaction of the following stated student needs:
  - To feel that they will, in fact, cope in the classroom
  - To explore their own capabilities
  - To feel they have achieved success (by their own standards)
  - To have new or fresh experience
  - To sort out or express their own ideas or opinions
  - To be liked, to get on with others
  - To help and be helped
  - To feel that their own contribution is appreciated by others (method, staff, peers, etc.)
  - To see themselves more clearly as teachers
  - To feel they have gained practical teaching skills
  - To feel they have developed relevant understanding of children
  - To feel they have developed relevant understanding of science;
- the perceived importance of the objectives (both stated and implied) of the unit;
- the likely usefulness of the unit for the in-service training of science teachers;
- the times during the year when the unit was most likely to be used; and,
- the extent to which the unit is likely to contribute to attainment of each of the stated objectives of the unit.

The particular questions asked of evaluators which provided the bases for this information can be referred to in the Final Evaluation Sheet in Appendix A. References to the particular questions on which each piece of information in the data summary on each unit is based are provided in the Key to Evaluation Information on each Unit on page 5. The information presented in the data summary is in the form of median responses to the various questions, rather than a more detailed representation of the percentage of respondents choosing each of the alternative responses to a question. The data was condensed in this way to simplify representation and to facilitate interpretation. Complete data on the percentage of evaluators who selected each of the alternative responses for each unit is provided in Section 2. No attempt has been made to incorporate the statements of the individual stated objectives of a unit on the data summary for a unit - only the title is provided, and reference will need to be made to the unit itself for these statements.

Only a portion of all the data gathered during the evaluation phase is included in the data summaries. Much of the additional data was gathered to assist in the modification and final editing of units, and for this reason and because it was often not amenable to the same sort of analysis as that included in the data summaries, it is not reported here. The usefulness of this additional data can only be judged in terms of its contribution to the quality of the published units.

Units on which Data Summaries are Provided

Information is provided in Sections 1 and 2 on only 42 of the 47 units included in the ASTEP publication. The other five units were produced too late in the life of the project to be adequately evaluated in the same way as other units, and so no data summary is provided for these units. The five units concerned are:

MT/3
MT/7
MT/10
LT/1
LT/9.

Two data summaries are provided for unit CC/5, which are referred to as CC/5.1 and CC/5.2 throughout this document. Unit CC/5 was produced by merging two trial units (ASTEP 28 and ASTEP 29), and the information for these two trial units are presented separately. The trial unit referred to as CC/5.1 corresponds closely to Steps 1 and 2 in the Suggested Approach for CC/5, whilst the trial unit referred to as CC/5.2 corresponds closely to Steps 3 and 4 in the Suggested Approach to CC/5.

For three of the units on which data summaries are provided, no data is provided on the extent to which the unit is likely to contribute to the attainment of the stated objectives of the unit. The units concerned are MT/5, CC/6 and CC/7, and in each case the stated objectives were substantially modified from the trial unit and the published version. In the case of CC/1, information is available on the extent to which the unit is likely to contribute to the attainment of some, but not all, of the stated objectives for similar reasons.

The Need for Care in Interpreting the Data Summaries

The data summaries provided in Sections 1 and 2 are based on evaluators' views on trial units. In some cases the units may have been substantially modified before publication after inspection of the evaluation data (both that reported in Sections 1 and 2 of this Handbook and the additional data not reported here). However, in virtually all cases the published unit can be regarded as closely similar to the corresponding trial unit, and therefore the data provided in this Handbook can be taken as a good approximation to the data that would be likely to be obtained in an evaluation of the published unit. It is, nevertheless, only an approximation because it is data based on a trial unit which is not necessarily identical with the published unit.

A second reason for caution in interpreting the Data Summaries arises from the relatively small number of evaluators from whom information was obtained on certain units. The average number of independent evaluators from whom information on a unit was obtained was just over 9. As a result of the relatively small number of evaluators for some units, and the basis on which the trial units were offered for trial, it is quite likely that the group of tutors who evaluated some of the units would be quite atypical of all potential users in the Australian context. It is even more likely that a potential user will be in a context quite disparate from the contexts in which the evaluators of a unit found themselves. There was some evidence in the evaluation data that units were considered to be differentially effective in different contexts and the objectives of the units of different importance in different contexts. The user of this Handbook must therefore interpret the data with this in mind, and exercise caution in generalising the evaluation data into his/her context. Particular caution will be required when it is apparent from the more detailed data presented in Section 2 that there is disagreement between evaluators in their opinions on particular units.

The data on the extent to which a unit is perceived likely to contribute to the attainment of its stated objectives is confounded by the fact that the statements of objectives vary considerably in their scope, and that units vary in the number of objectives. Responses to the first and the last questions on the data summary for each unit reflect not only the effectiveness of the unit, but also the modesty or ambitiousness of the authors' claims in stating the objectives of the unit, the specificity with which they are stated, and the intrinsic difficulty of promoting attainment of the objectives concerned. Thus, when interpreting the responses to these first and last questions in the data summary, the reader needs to consider the actual statement of objectives of the unit.

Key to Evaluation Information on Each Unit

A key to the interpretation of the evaluation information in the data summary for each unit is provided on page 5. This key includes a reference to the actual questions asked of the evaluators in Appendix A which is provided to supplement the necessarily brief description of the question provided on the data summary itself. In particular, the brief description of student needs provided in the data summary needs to be interpreted in the light of the more detailed statements in the introduction to Section 2 and in Question 13 in Appendix A.

KEY TO EVALUATION INFORMATION ON EACH UNIT

UNIT NUMBER

UNIT ZY/9

Median response on likely extent of promotion of student teacher attainment of the ascribed objectives on a five point scale from 1 (Not at All) to 5 (Very Much) (Question 8 in Appendix A and page 34, Section 2)

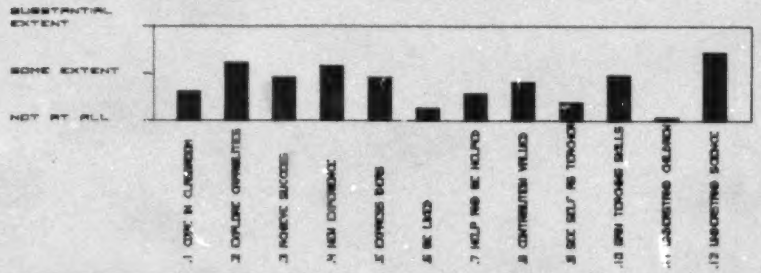
1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE ASCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

Median response on a five point scale from 1 (Not at All) to 5 (Very Much) (Question 6 in Appendix A and page 32, Section 2)

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



Median response on extent of contribution to, or satisfaction of, various student needs on a three point scale
1 = Not at all, or to a negligible extent;
2 = To some extent;
3 = To a substantial extent
(Question 13 in Appendix A and pages 35 to 46 in Section 2)

4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

NO IMPORTANCE — ESSENTIAL

Median response on question dealing with the perceived importance of the objectives (both stated and implied) of the unit in a course for student teachers in science on a four point scale
1 = Of little or no importance or interest;
2 = Interesting objectives, but of low priority;
3 = Important, but not essential objectives;
4 = Essential objectives
(Question 7 in Appendix A and page 33, Section 2)

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

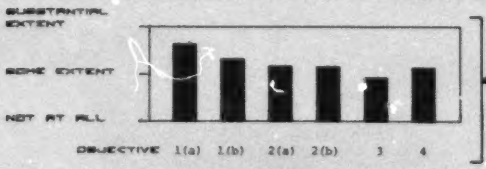
NO USE — EXTREMELY USEFUL

Median response on usefulness of the unit for the in-service training of science teachers on a three point scale
1 = Of very little or no use;
2 = Of some use;
3 = Extremely useful.
(Question 5 in Appendix A and page 31, Section 2)

6. TIME OF YEAR OF LIKELY USE: EARLY

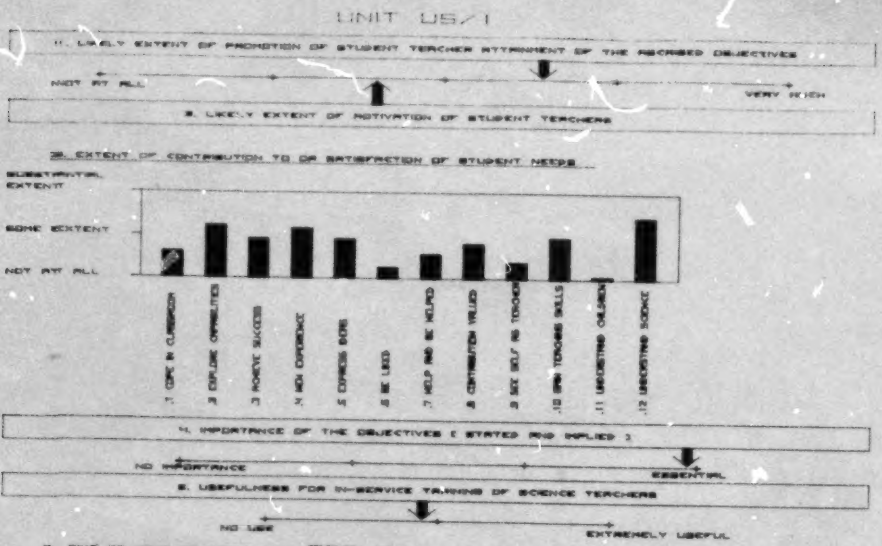
A summary statement of responses to question dealing with time of likely use of unit (more detailed information provided on page 30 of Section 2; see Question 3 in Appendix A)

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

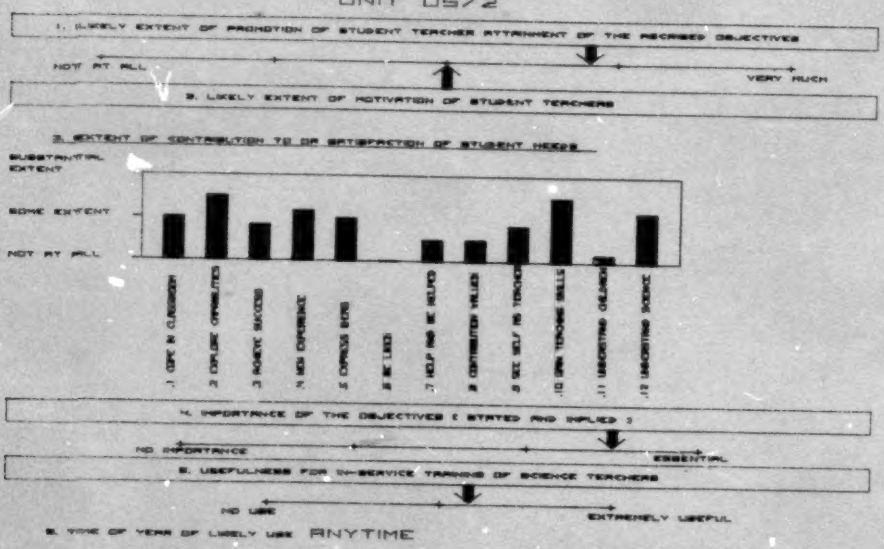


Median response on extent of contribution to attainment of each of the stated objectives of the unit on a three point scale
1 = Not at all or to a negligible extent;
2 = To some extent;
3 = To a substantial extent.
(Question 9 in Appendix A - see also Section 3)

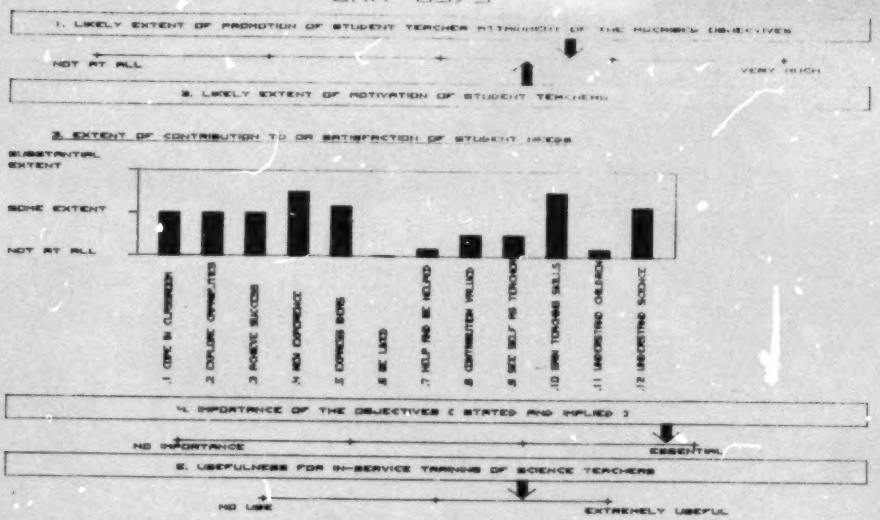
UNIT US/1


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1. CPE IN CLASSROOM
2. EXPLORE OPPORTUNITIES
3. POSITIVE SUCCESS
4. NEW EXPERIENCE
5. EXPRESS SELVES
6. BE LIKED
7. HELP AND BE HELPED
8. CONTRIBUTION VALUED
9. SEE SELF AS TEACHER
10. OWN TEACHING SKILLS
11. UNDERSTAND CHILDREN
12. UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE EARLY
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2 3 4 5 6

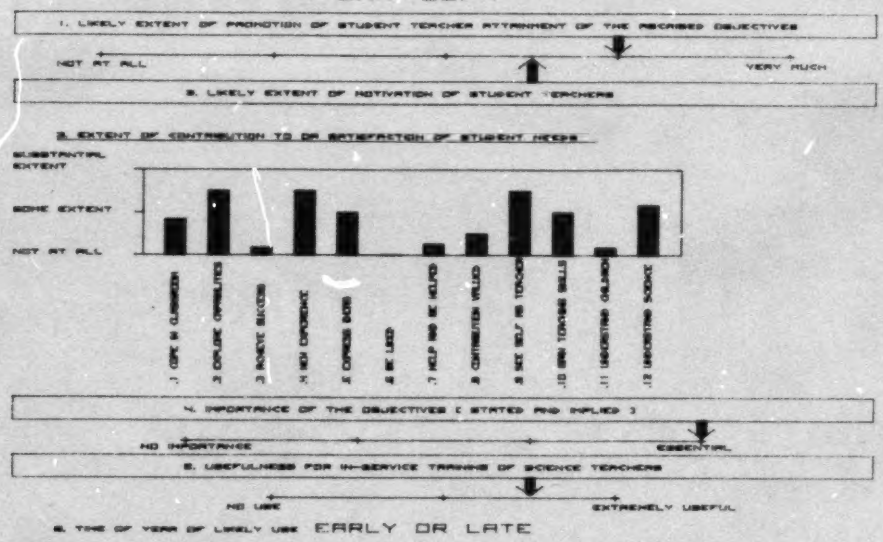
UNIT US/2


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1. CPE IN CLASSROOM
2. EXPLORE OPPORTUNITIES
3. POSITIVE SUCCESS
4. NEW EXPERIENCE
5. EXPRESS SELVES
6. BE LIKED
7. HELP AND BE HELPED
8. CONTRIBUTION VALUED
9. SEE SELF AS TEACHER
10. OWN TEACHING SKILLS
11. UNDERSTAND CHILDREN
12. UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE ANYTIME
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2

UNIT US/3


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE RECORDED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 EXPLORE CAPABILITIES
3 ACHIEVE SUCCESS
4 NEW EXPERIENCE
5 EXPRESS SELF
6 BE LIKED
7 HELP AND BE HELPED
8 CONTRIBUTION VALUED
9 SEE SELF AS TEACHER
10 GAIN TEACHING SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE EARLY
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2

UNIT US/4


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE RECORDED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 EXPLORE CAPABILITIES
3 ACHIEVE SUCCESS
4 NEW EXPERIENCE
5 EXPRESS SELF
6 BE LIKED
7 HELP AND BE HELPED
8 CONTRIBUTION VALUED
9 SEE SELF AS TEACHER
10 GAIN TEACHING SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE EARLY OR LATE
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2 3 4 5 6

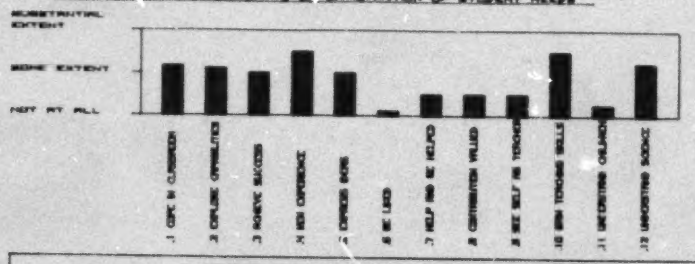
UNIT US/5

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES

NOT AT ALL ← → VERY MUCH

5. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

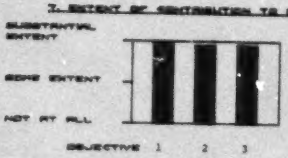
NO IMPORTANCE ← → ESSENTIAL

6. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE ← → EXTREMELY USEFUL

8. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



UNIT US/6

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES

NOT AT ALL ← → VERY MUCH

5. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS

4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

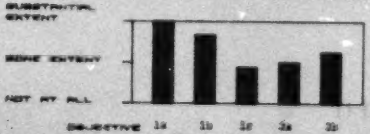
NO IMPORTANCE ← → ESSENTIAL

6. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

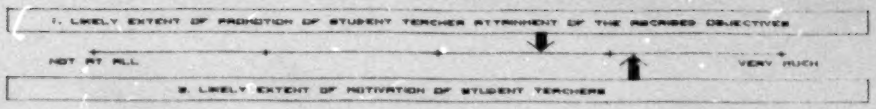
NO USE ← → EXTREMELY USEFUL

8. TIME OF YEAR OF LIKELY USE MIDDLE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



UNIT US/7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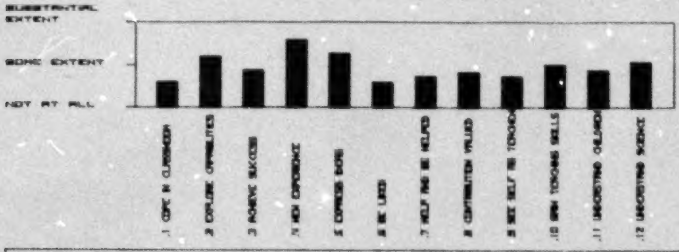

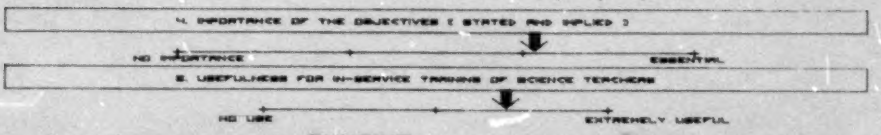
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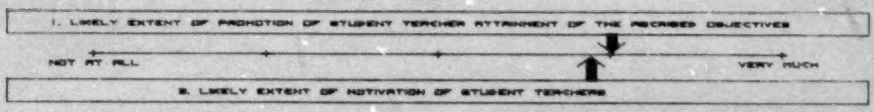
EXTREMELY USEFUL

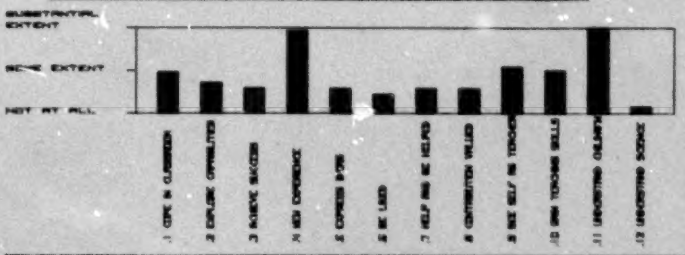
6. TIME OF YEAR OF LIKELY USE ANYTIME

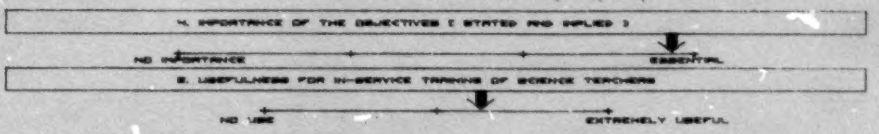
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

UNIT UP/1


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE ASCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

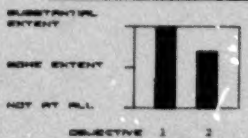
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



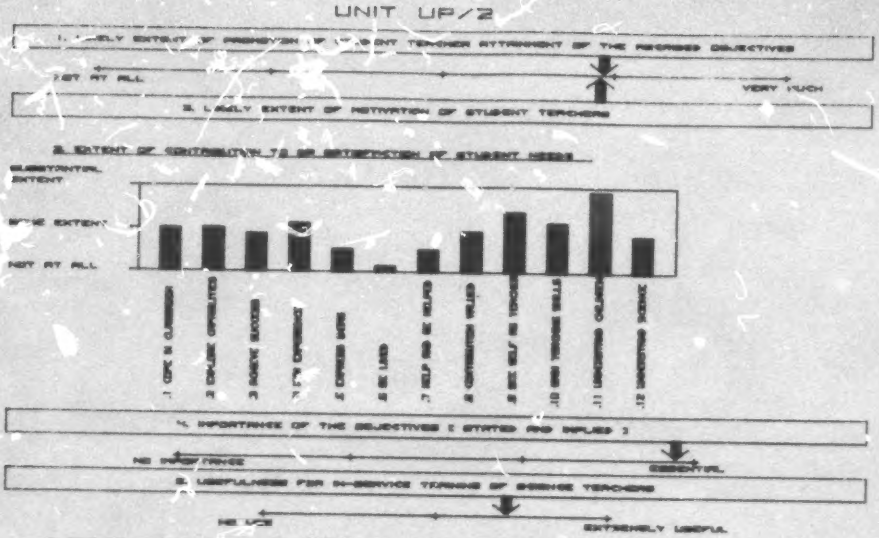

4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

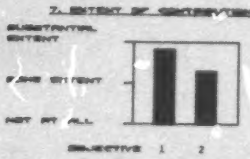
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



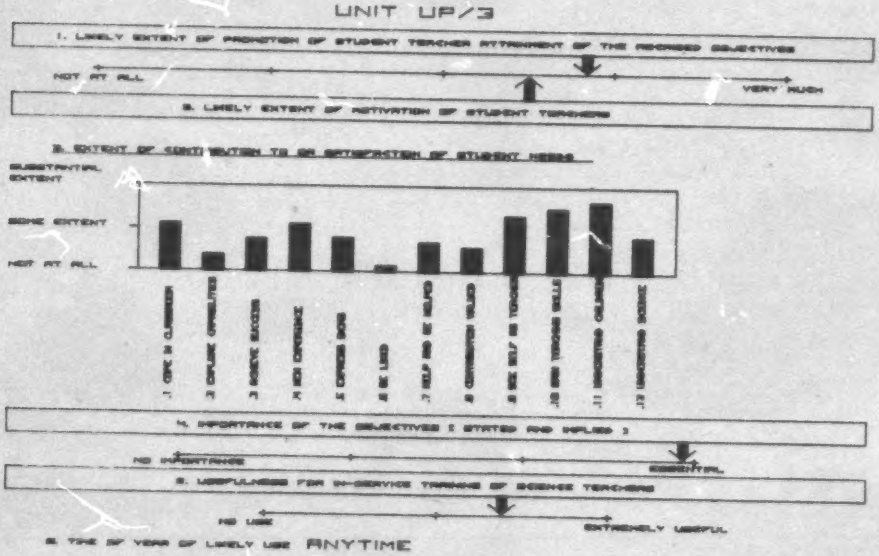
UNIT UP/2


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1. GOOD IN CLASSROOM
2. ENJOYS OPPORTUNITIES
3. KNOWS SUBJECT
4. HAS CONFIDENCE
5. EXPRESS SELF
6. BE LIKED
7. HELP PUPILS BE HELPED
8. CONTRIBUTE SELF
9. BE SELF IN TEACHING
10. USE TRAINING SKILLS
11. UNDERSTAND OBJECTIVES
12. UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES I STATED AND IMPLIED 3
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

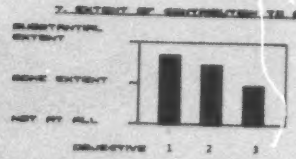
6. TYPE OF YEAR OF LIKELY USE EARLY OR MIDDLE



UNIT UP/3


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1. GOOD IN CLASSROOM
2. ENJOYS OPPORTUNITIES
3. KNOWS SUBJECT
4. HAS CONFIDENCE
5. EXPRESS SELF
6. BE LIKED
7. HELP PUPILS BE HELPED
8. CONTRIBUTE SELF
9. BE SELF IN TEACHING
10. USE TRAINING SKILLS
11. UNDERSTAND OBJECTIVES
12. UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES I STATED AND IMPLIED 3
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TYPE OF YEAR OF LIKELY USE ANYTIME



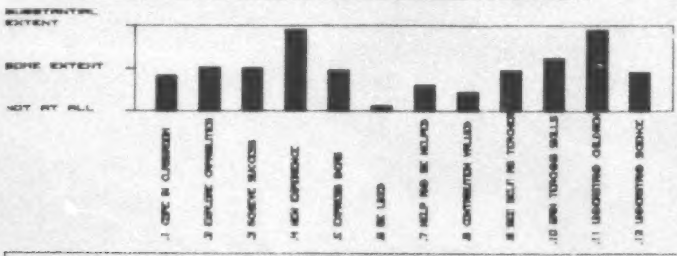
UNIT UP/4

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

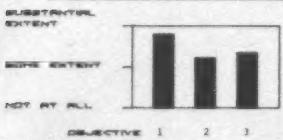
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



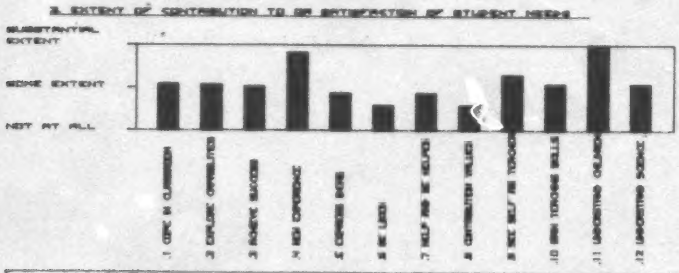
UNIT UP/5

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

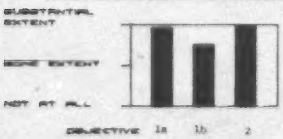
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

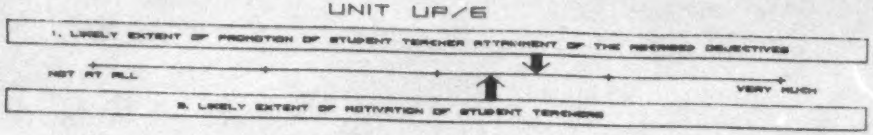
NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE EARLY OR MIDDLE

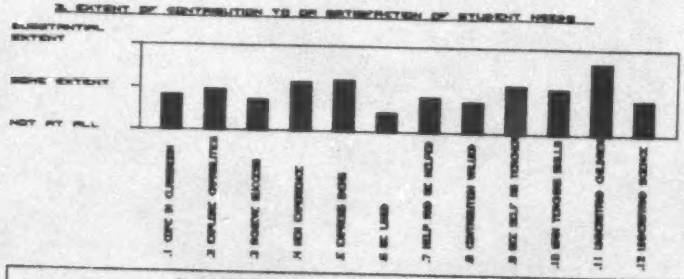
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



UNIT UP/6

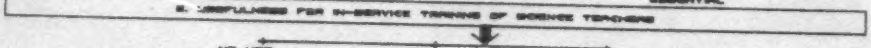

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE REVISED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



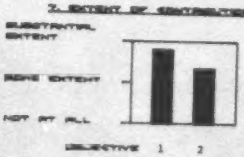
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

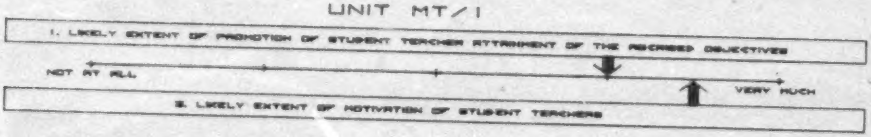


6. TIME OF YEAR OF LIKELY USE MIDDLE

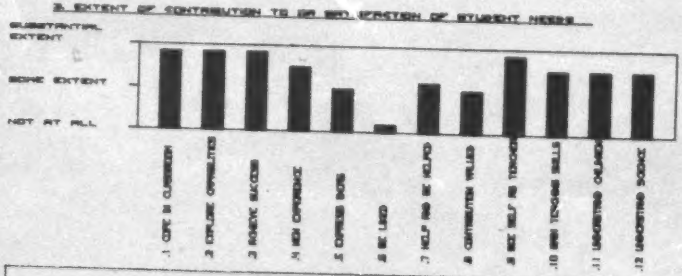
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



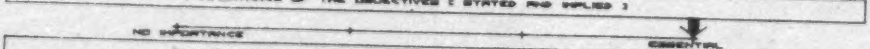
UNIT MT/1


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE REVISED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

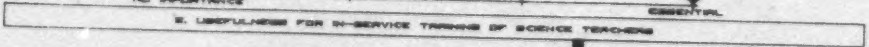
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)



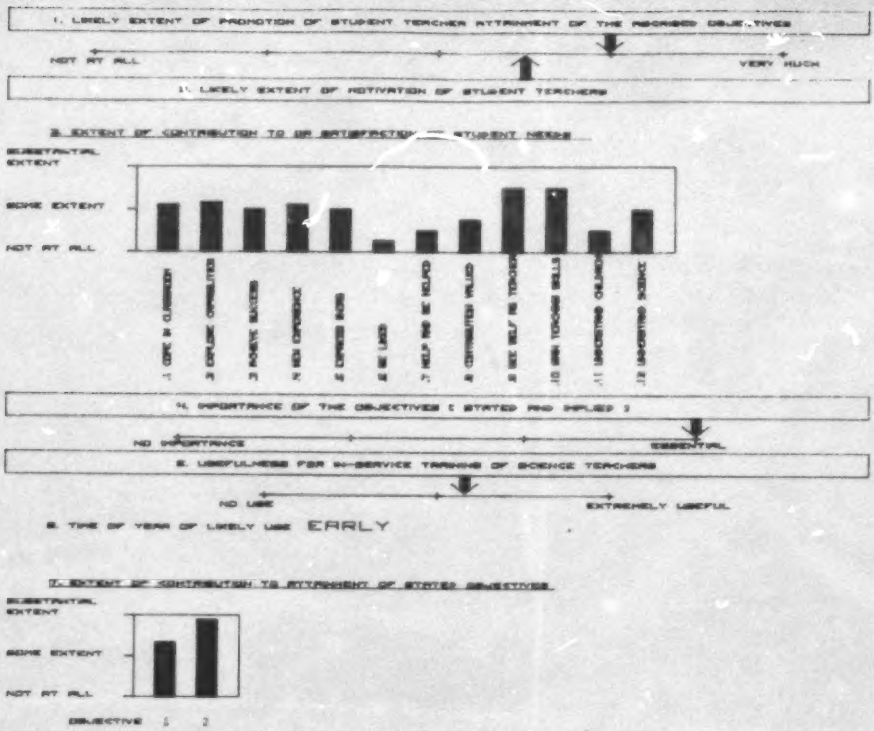
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS



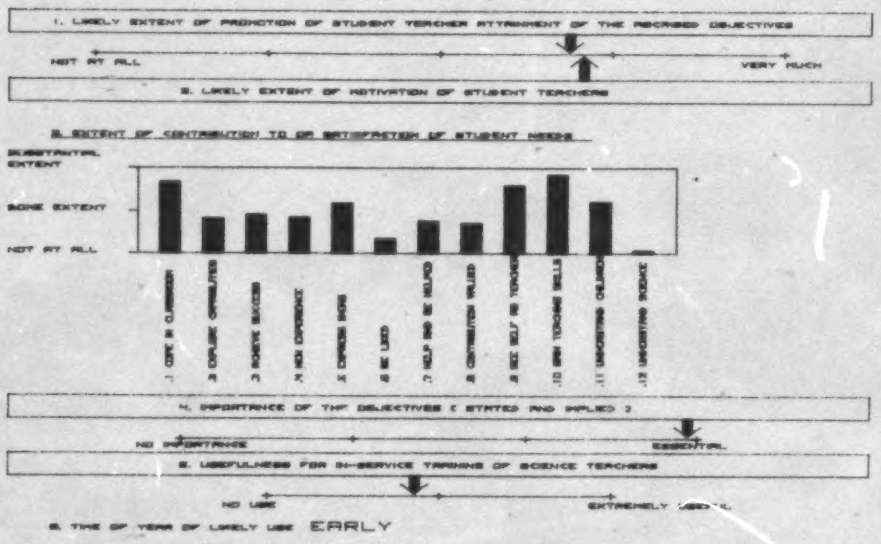
6. TIME OF YEAR OF LIKELY USE EARLY

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

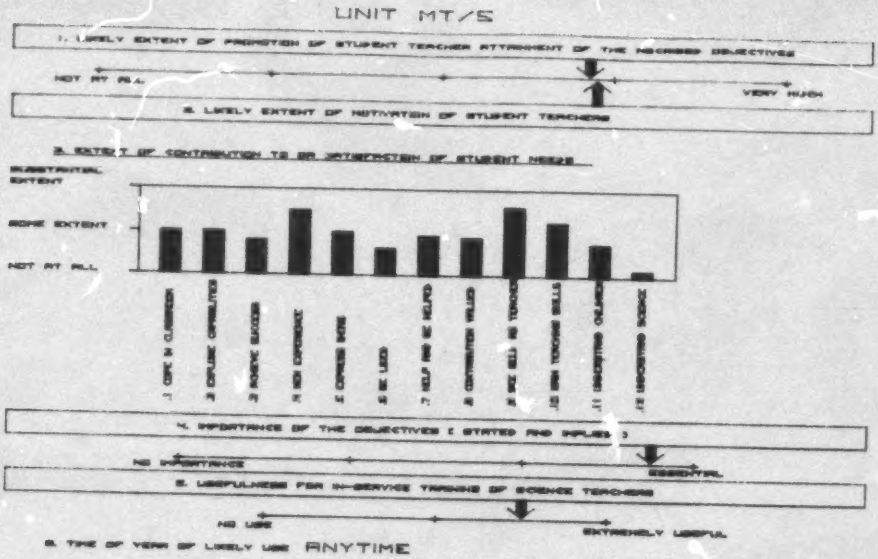
UNIT MT/2


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE EARLY
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2

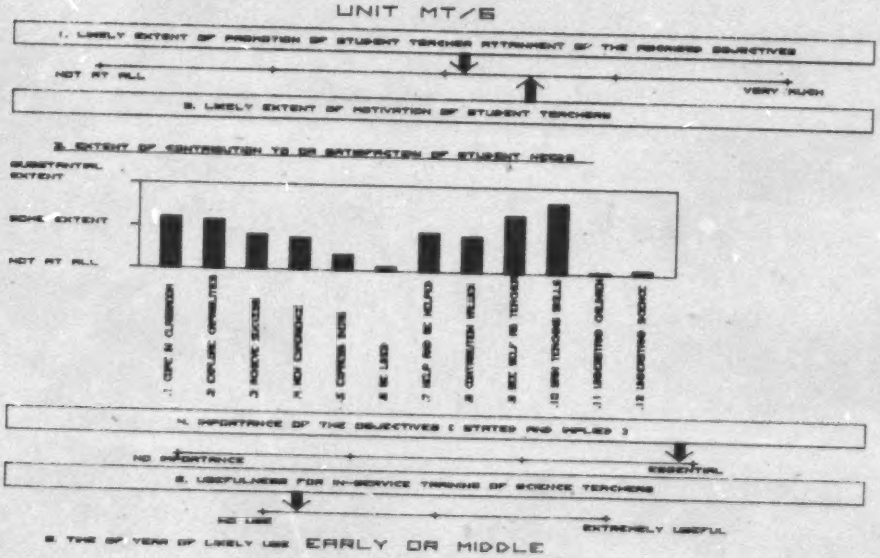
UNIT MT/4


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
6. TIME OF YEAR OF LIKELY USE EARLY
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2

UNIT MT/5


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE REVISED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 CPC/SC CPR/LITES
3 ROWE SCCSS
4 HOI EXPERIENCE
5 EXPRESS MORE
6 BE LIKED
7 HELP AND BE HELPED
8 CONTRIBUTION WILDS
9 SEE SELF AS TEACHER
10 SEE TEACHING SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE ANYTIME
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2 3

UNIT MT/6


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE REVISED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 CPC/SC CPR/LITES
3 ROWE SCCSS
4 HOI EXPERIENCE
5 EXPRESS MORE
6 BE LIKED
7 HELP AND BE HELPED
8 CONTRIBUTION WILDS
9 SEE SELF AS TEACHER
10 SEE TEACHING SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL
6. TIME OF YEAR OF LIKELY USE EARLY OR MIDDLE
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
OBJECTIVE 1 2 3

UNIT MT/8

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS

4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE EARLY OR MIDDLE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

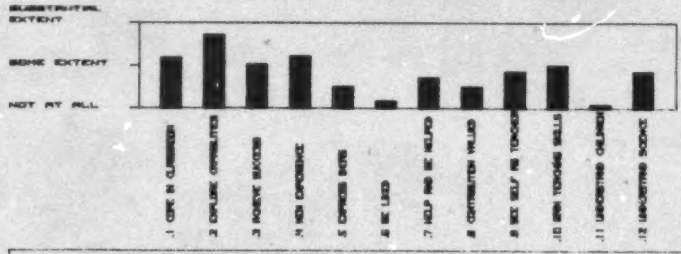
UNIT MT/9

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

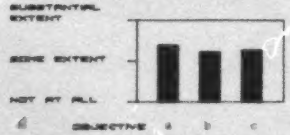
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



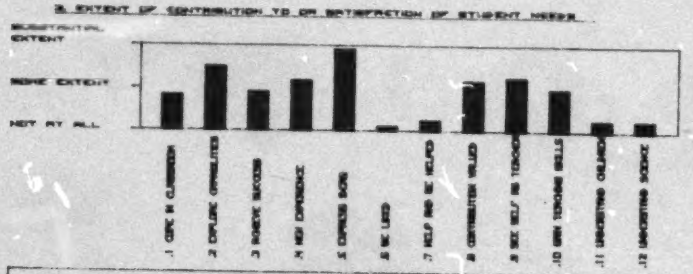
UNIT MT/11

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

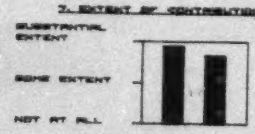
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE EARLY OR LATE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



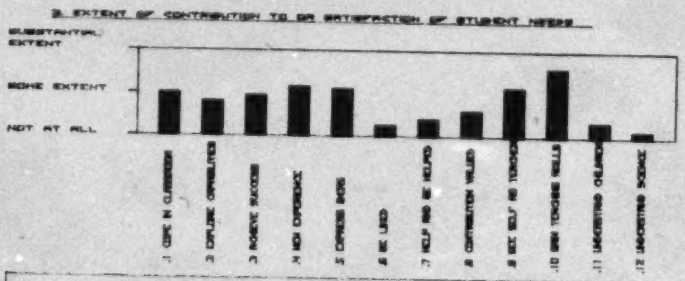
UNIT MT/12

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

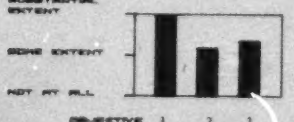
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

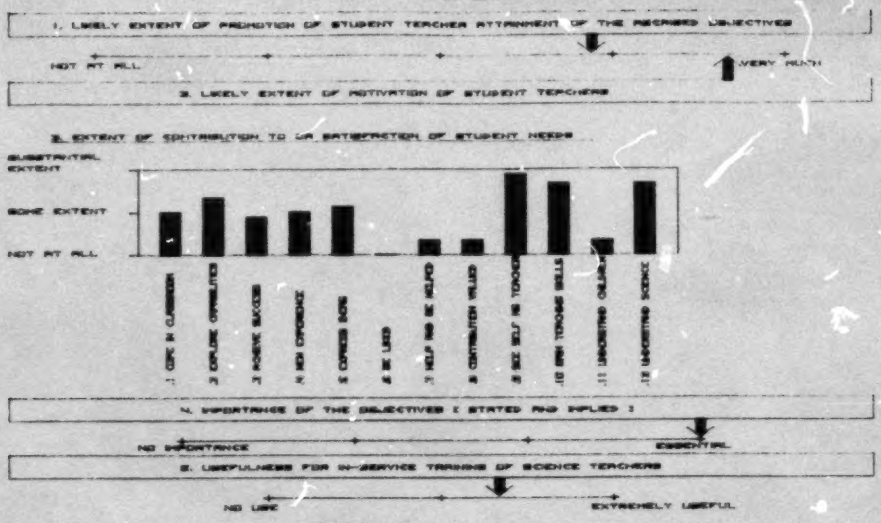
6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



PAGES 17-18 WERE MISSING FROM THIS
DOCUMENT PRIOR TO ITS BEING SHIPPED
TO EDRS FOR FILMING

UNIT CC/S.1

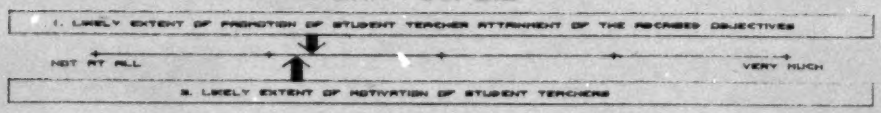

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS

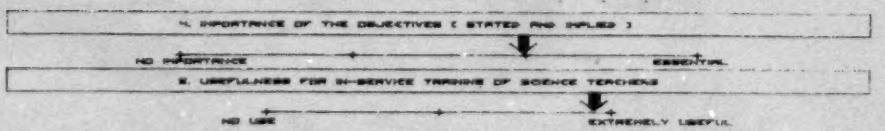
6. TIME OF YEAR OF LIKELY USE EARLY

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

UNIT CC/S.2


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

2. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS


4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE MIDDLE

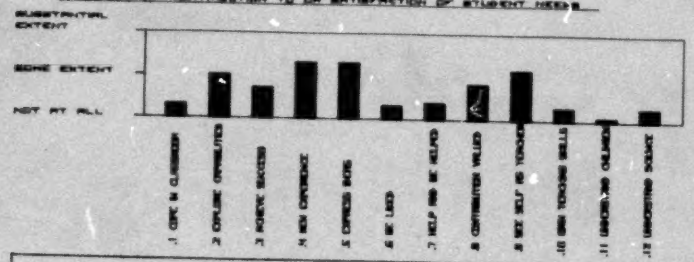
UNIT CC/6

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TYPE OF YEAR OF LIKELY USE LATE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

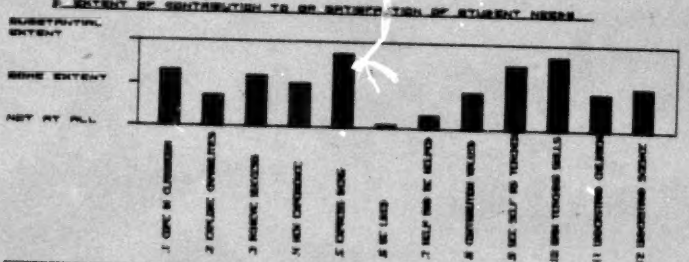
UNIT CC/7

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

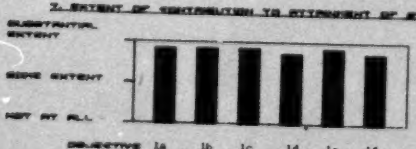
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TYPE OF YEAR OF LIKELY USE EARLY OR MIDDLE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



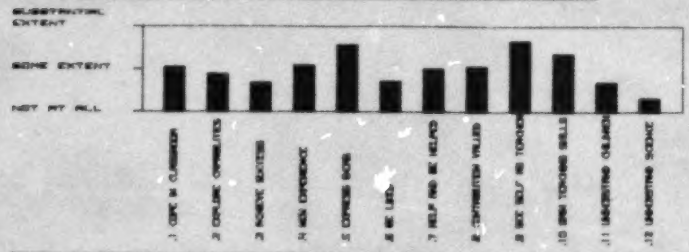
UNIT CC/8

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE RECORDED OBJECTIVES

NOT AT ALL — VERY MUCH

8. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

9. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

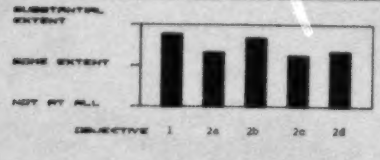
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



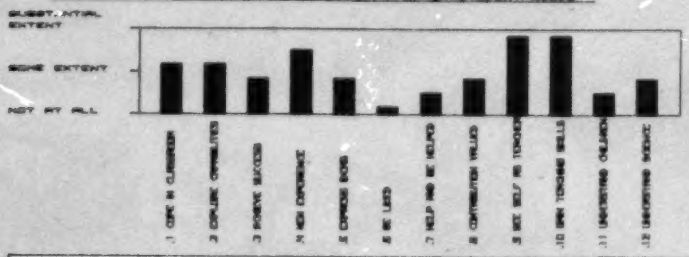
UNIT LT/2

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE RECORDED OBJECTIVES

NOT AT ALL — VERY MUCH

8. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

9. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

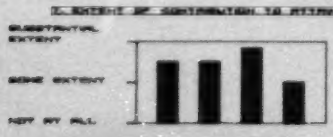
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

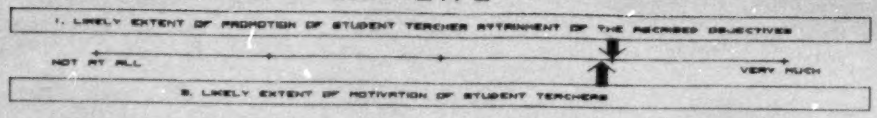
NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE MIDDLE

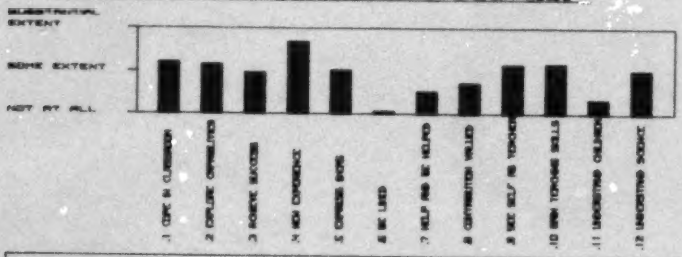
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

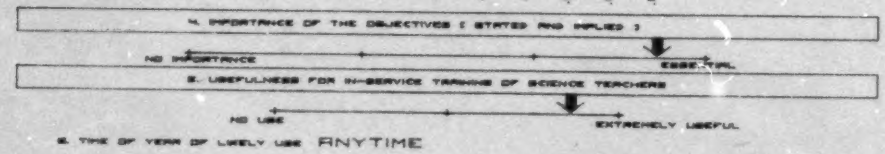


UNIT LT/3


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE ASCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
9. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

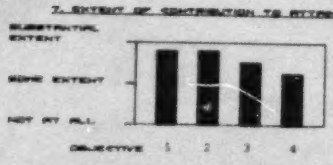
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



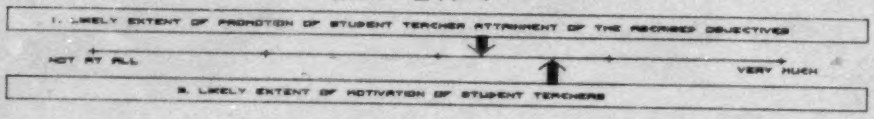

4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

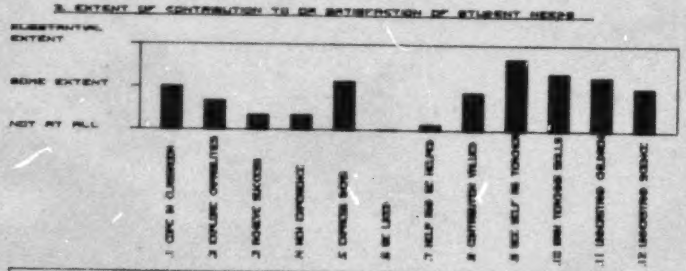
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

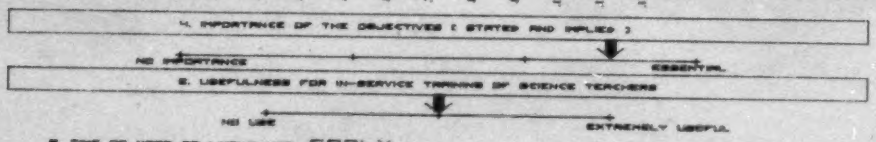


UNIT LT/4


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE ASCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
9. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

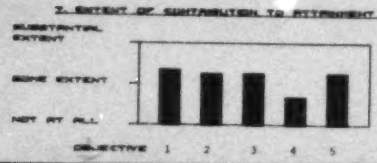
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS




4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE EARLY

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



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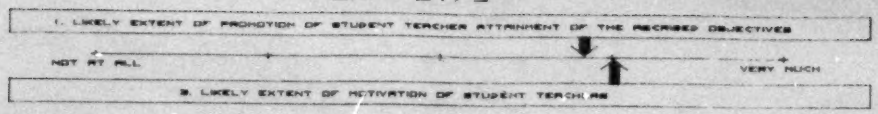
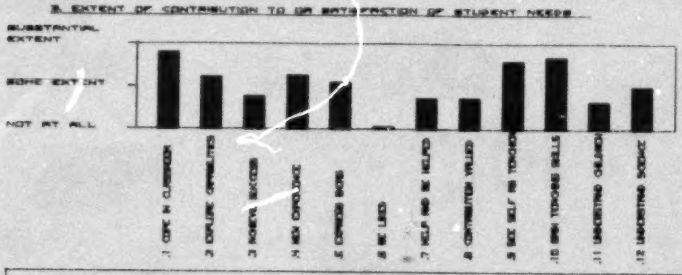
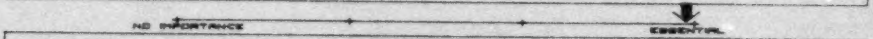

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



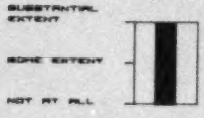
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)



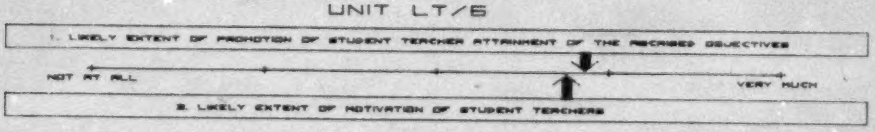
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

6. TIME OF YEAR OF LIKELY USE ANYTIME

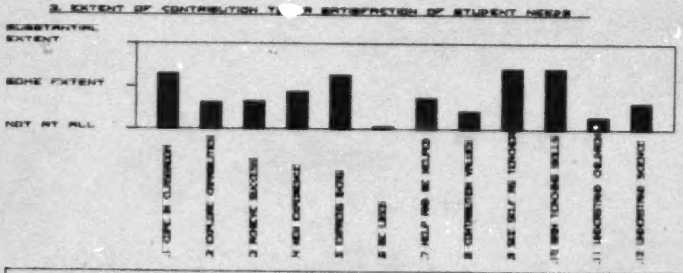
7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



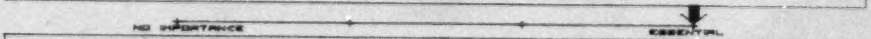
UNIT LT/6


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



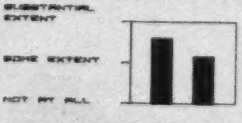
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)



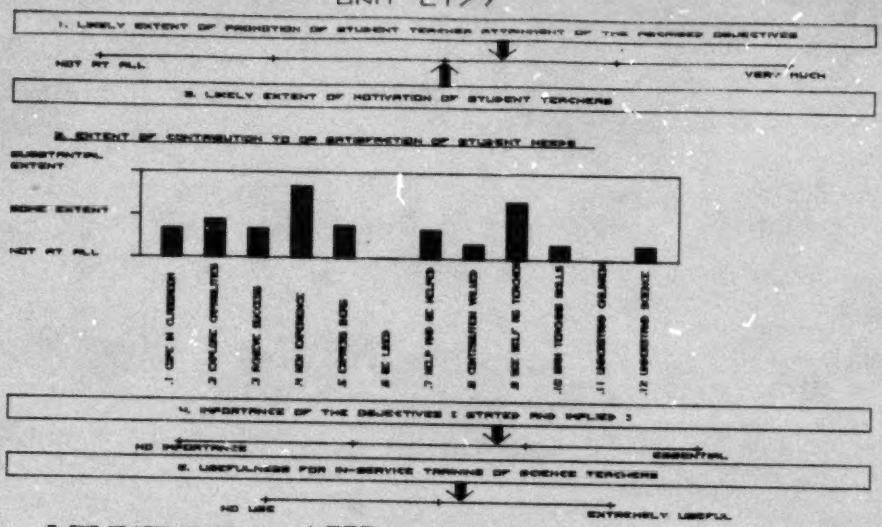
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

6. TIME OF YEAR OF LIKELY USE: ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



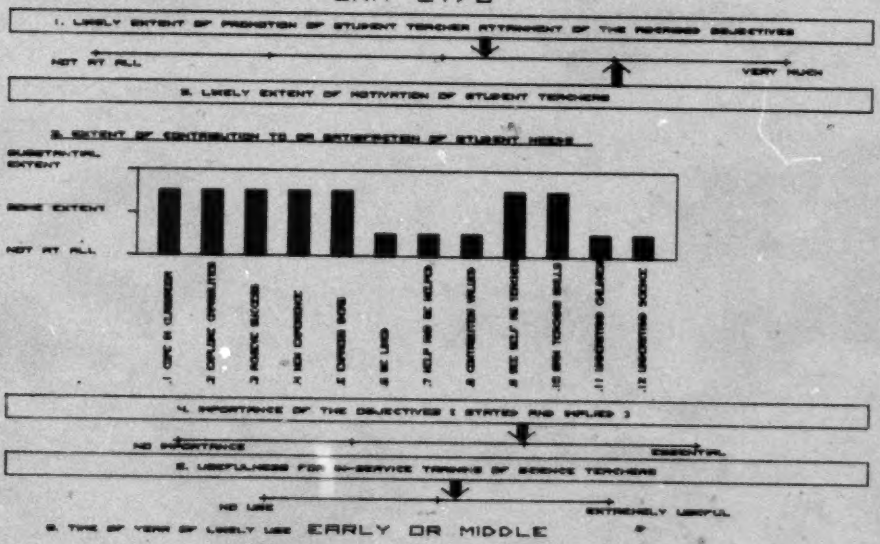
UNIT LT/7


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 CPC/SC CONSULTED
3 INSERV SUCCES
4 SCI EXPERIENCE
5 EXPRESS SCIS
6 BE LIKED
7 HELP PUPILS BE HELPED
8 CONTRIBUTION VALUED
9 SEE SELF AS TEACHER
10 GEN TEACHER SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE LATE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

UNIT LT/8


1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PROPOSED OBJECTIVES
NOT AT ALL
VERY MUCH
2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS
3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS
SUBSTANTIAL EXTENT
SOME EXTENT
NOT AT ALL
1 CPC IN CLASSROOM
2 CPC/SC CONSULTED
3 INSERV SUCCES
4 SCI EXPERIENCE
5 EXPRESS SCIS
6 BE LIKED
7 HELP PUPILS BE HELPED
8 CONTRIBUTION VALUED
9 SEE SELF AS TEACHER
10 GEN TEACHER SKILLS
11 UNDERSTAND CHILDREN
12 UNDERSTAND SCIENCE
4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)
NO IMPORTANCE
ESSENTIAL
5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS
NO USE
EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ERRLY OR MIDDLE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

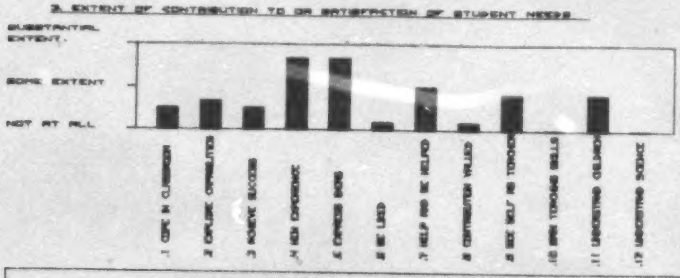
UNIT RC/1

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

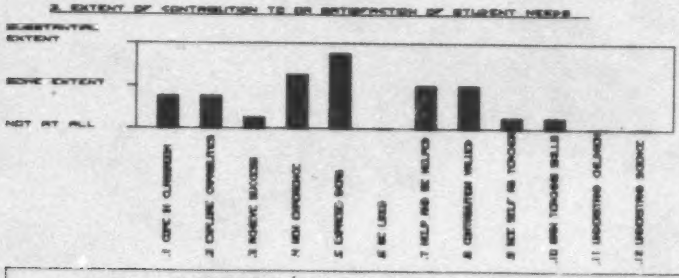
UNIT RC/2

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

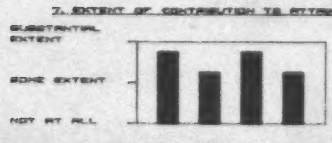
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



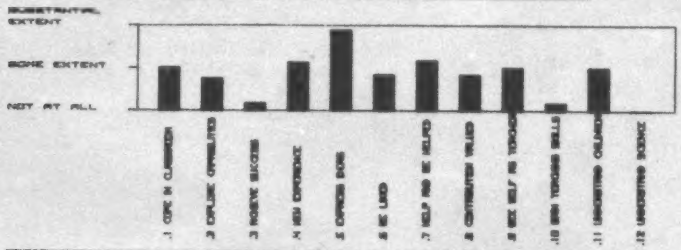
UNIT RC/3

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PREFERRED OBJECTIVES

NOT AT ALL — VERY MUCH

3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES

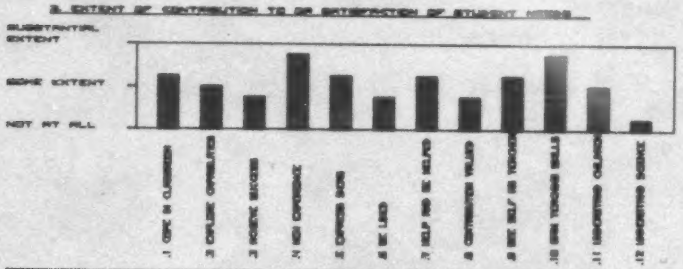
UNIT RC/4

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PREFERRED OBJECTIVES

NOT AT ALL — VERY MUCH

3. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

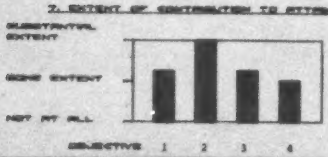
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE ANYTIME

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



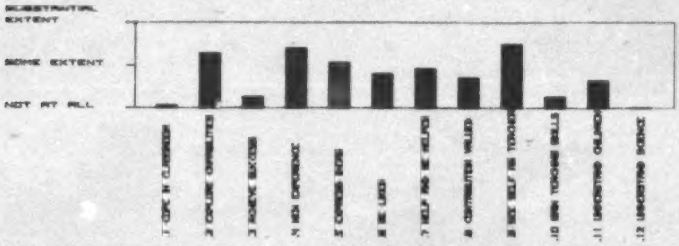
UNIT RC/S

1. LIKELY EXTENT OF PROMOTION OF STUDENT TEACHER ATTAINMENT OF THE PRESCRIBED OBJECTIVES

NOT AT ALL — VERY MUCH

2. LIKELY EXTENT OF MOTIVATION OF STUDENT TEACHERS

3. EXTENT OF CONTRIBUTION TO OR SATISFACTION OF STUDENT NEEDS



4. IMPORTANCE OF THE OBJECTIVES (STATED AND IMPLIED)

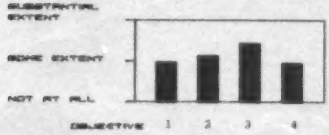
NO IMPORTANCE — ESSENTIAL

5. USEFULNESS FOR IN-SERVICE TRAINING OF SCIENCE TEACHERS

NO USE — EXTREMELY USEFUL

6. TIME OF YEAR OF LIKELY USE LATE

7. EXTENT OF CONTRIBUTION TO ATTAINMENT OF STATED OBJECTIVES



SECTION 2: COMPARISON OF UNITS IN TERMS OF EVALUATORS' RESPONSES TO PARTICULAR QUESTIONS

Introduction

Section 2 is based on the same data as Section 1, but the data is presented in more detail and in an entirely different arrangement. Whereas Section 1 presented a summary of data from a number of questions for each unit in turn, in Section 2 the data is arranged question by question.

The data on each question is presented as a series of bar graphs, one for each of the units evaluated. The bar graph for each unit represents the percentage of all the evaluators of that unit who selected each of the individual responses to the question in accordance with a KEY provided at the top of the page. The data is presented in this form to facilitate direct comparison of individual units in terms of evaluators' responses to particular questions. For example, reference to the data for Question 6 on page 32 enables direct comparison of various units in terms of the extent to which they were considered likely to motivate student teachers. Similarly, the data for Questions 13.1 to 13.12 on pages 35 to 46 facilitates the identification of units which were perceived to be particularly successful in contributing to the satisfaction of each of the twelve student needs described in these questions.

The questions are arranged in Section 2 in the same order as information was presented for individual units in Section 1, but for two notable changes. Detailed information on the extent to which units are perceived to contribute to the attainment of each of the stated objectives of each unit are not included in Section 2, but are presented in Section 3. In addition, data on Question 1 which is concerned with the likelihood of the evaluator using the unit in one or more of his courses was included in Section 2, but not in Section 1. It was decided to exclude data on this question from the information on individual units presented in Section 1 because the nature of the alternative responses offered in the question was such that it was difficult to conceive how they could be arranged along a single scale so that a median response to the question could be calculated and represented. The data on this particular question is provided on page 29.

Interpretation of the Data in Section 2 : Some Warnings

Some caution must be exercised in interpreting the data presented in this section. The various shortcomings of the data already referred to in the introduction to Section 1 apply with equal force to the data presented in Section 2. In particular, the previously emphasised point that the data reflects evaluators' opinions of the trial units which may differ from the published versions needs to be kept in mind.

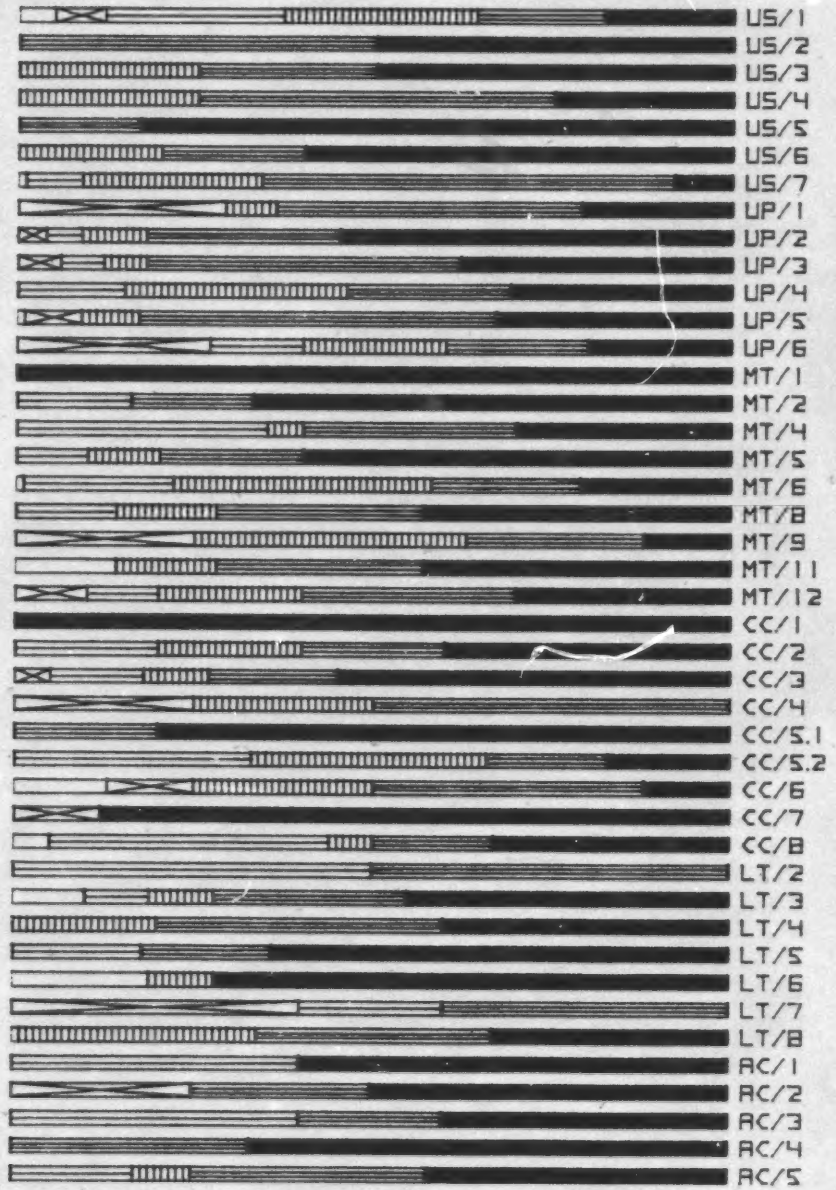
In addition, since the opinions of relatively small numbers of evaluators are represented in the bar graphs for individual units, small differences between responses for pairs of units should be interpreted with extreme caution. Such small differences will frequently arise from sampling fluctuations in the evaluators concerned, and would be unlikely to represent statistically significant differences in the attributes of the units being compared. However, even a cursory inspection of the data on the various questions indicates that there are clear differences between units in terms of evaluators' perceptions of their attributes. For example, the data on Question 5 on page 31 indicates large variations between units in their perceived usefulness for the in-service training of science teachers. As a further example, the data on Question 13.11 indicates that the units concerned with Understanding Pupils (UP/1 to UP/6) are perceived to make a more substantial contribution to student teachers' understanding of children than units in other areas developed by ASTEP.

A further point must be born in mind in interpreting the data on Question 8 on page 34. The units differ substantially in the scope of the ascribed objectives, both in terms of the number of objectives stated, and in terms of the specificity of the stated objectives. There is a tendency for responses to Question 8 to reflect not only the effectiveness of the unit, but also the modesty or ambitiousness of the authors' claims in stating the objectives of the unit. Thus, when interpreting responses to Question 8, the reader needs to consider the actual statements of the objectives for the unit, and also the data on the extent of the contribution of the unit to the achievement of individual stated objectives provided in Section 1 for each unit.

Question 1
Would you be likely to use the unit in one or more of your courses?

KEY

- I would certainly include it in my course
- I would try to include it in my course if time could be found
- I would not include it in my course
- I would include it in my course with some modification
- I would include it in my course, but only for some students
- No response



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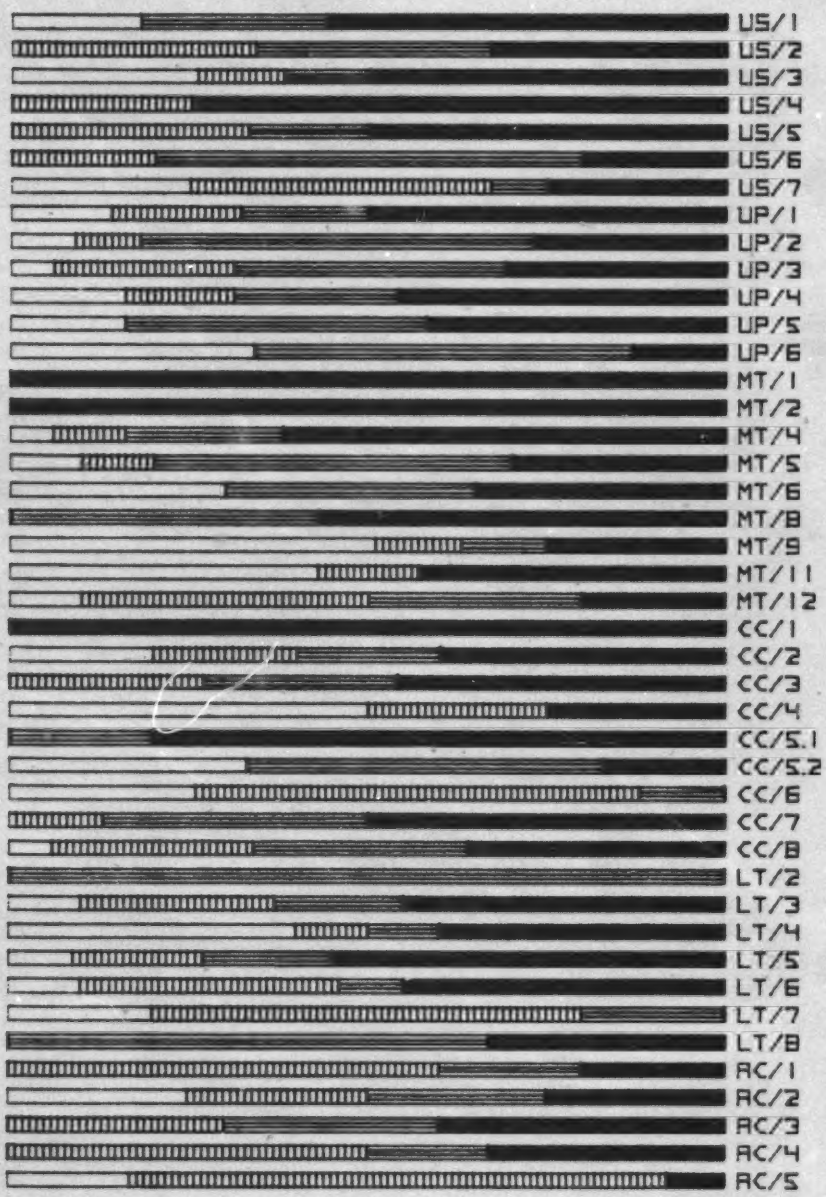
Question 3

When in the year would you be likely to use the unit?

KEY

- In the first third of the year
- In the middle third of the year
- In the last third of the year
- No response

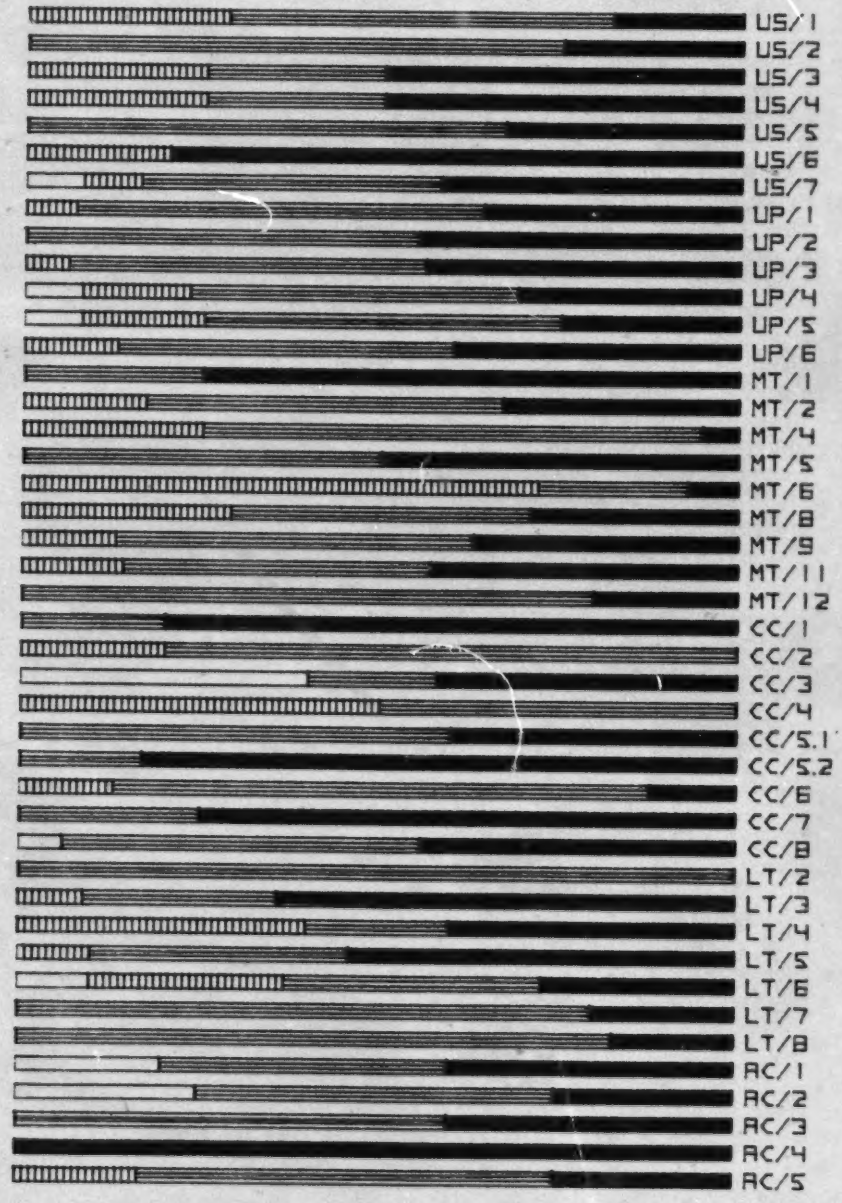


Question 5

How useful do you consider the unit would be for the in-service training of science teachers?

KEY

- Extremely useful
- Of some use
- Of very little or no use
- No response



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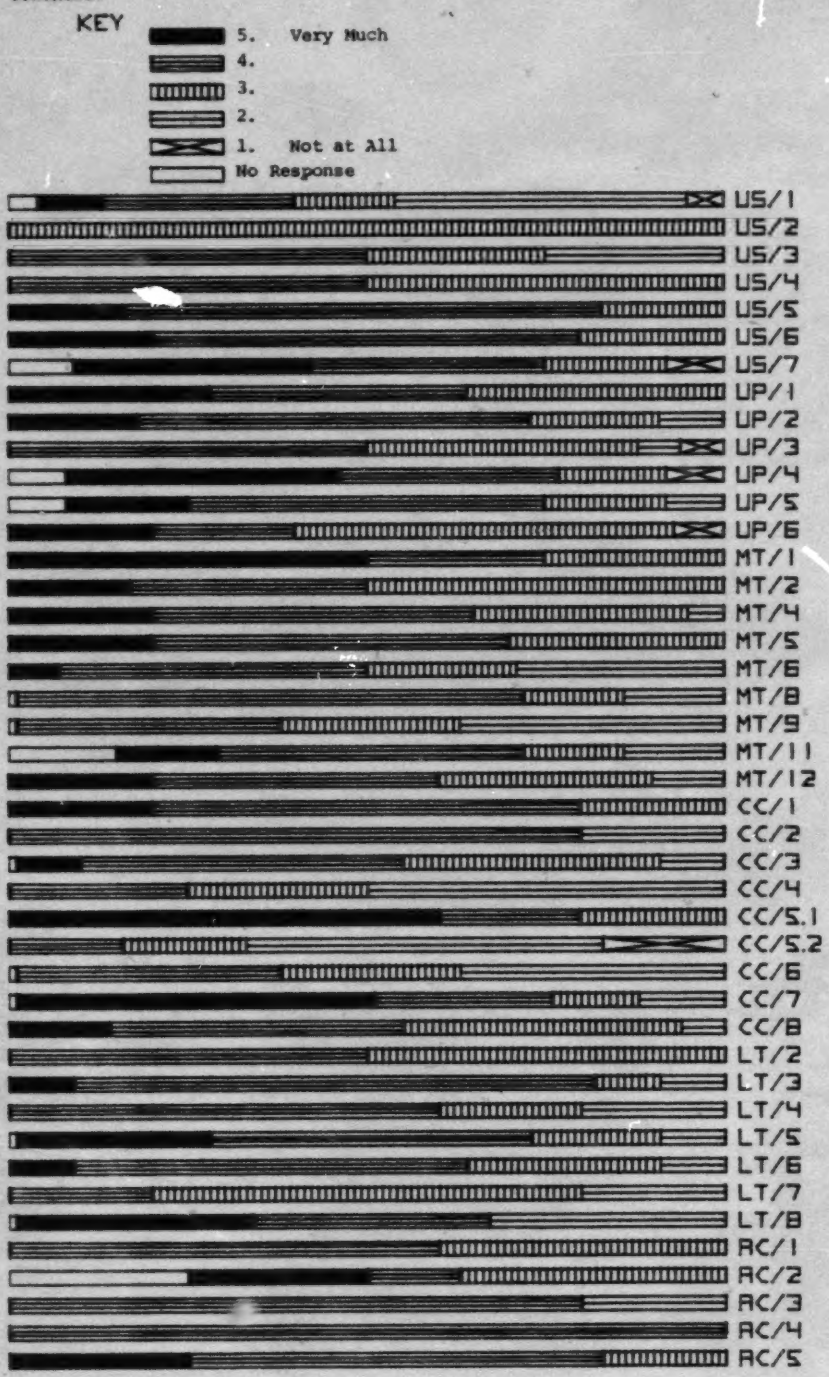
Question 6

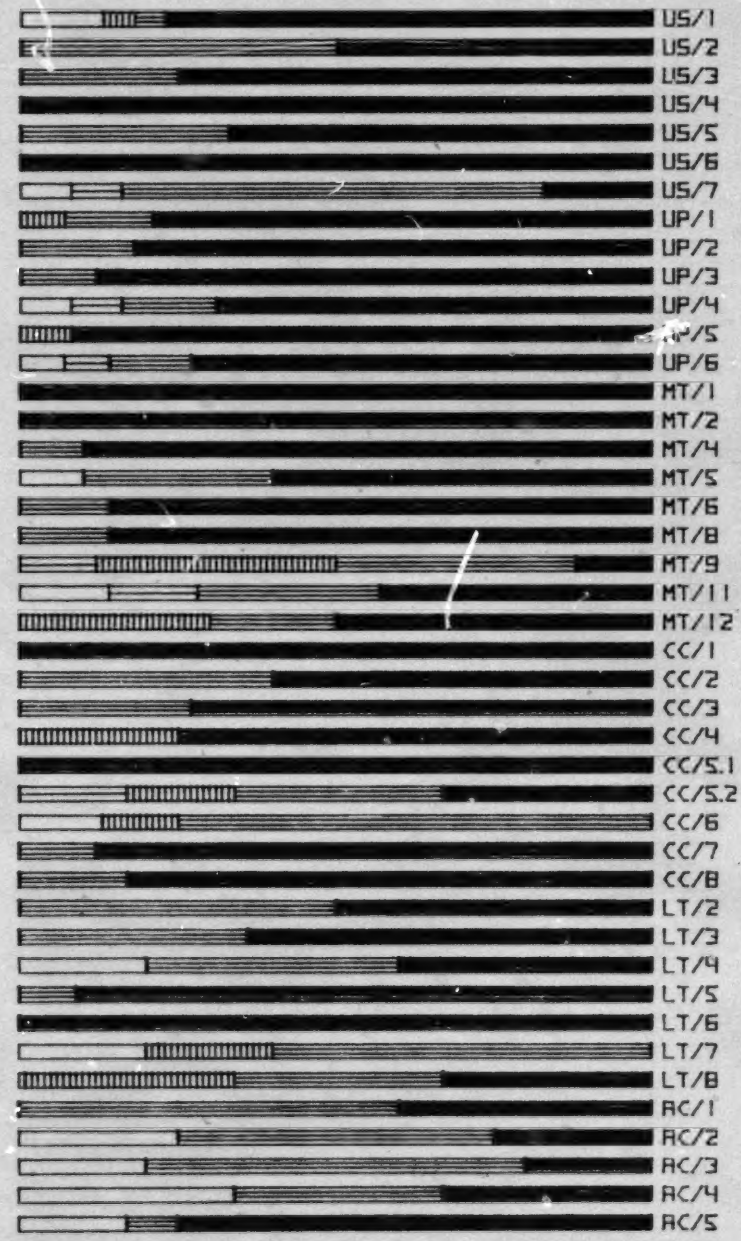
To what extent do you consider that the unit would be likely to motivate your student teachers?



Question 7
How important do you consider the objectives (both stated and implied) of the unit?

KEY

- Essential objectives in a course for student teachers in science
- Important, but not essential objectives for student teachers in science
- Interesting objectives, but of low priority in a course for student teachers in science
- Of little or no importance or interest in a course for student teachers in science
- No response



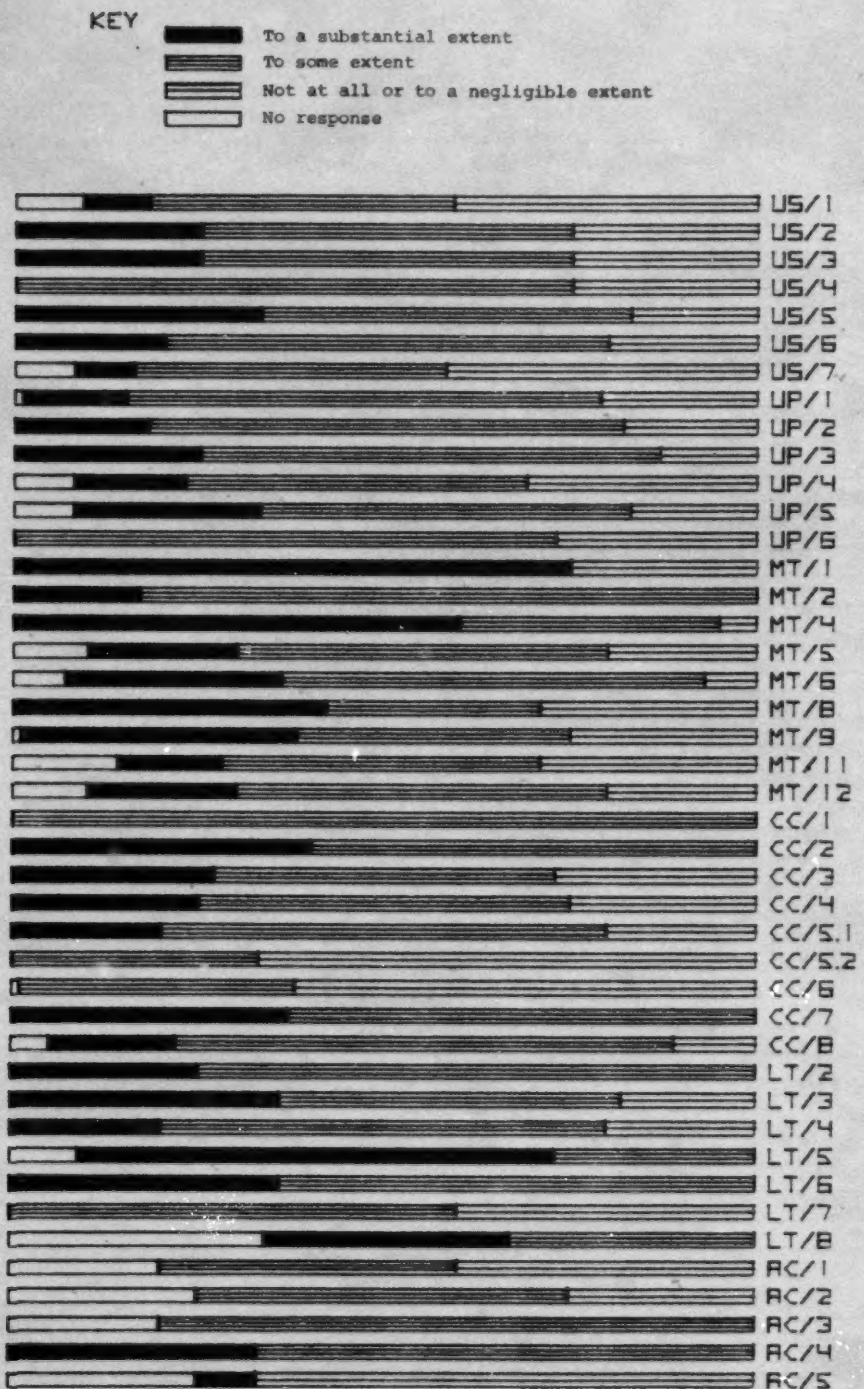
Question 8

In general terms, to what extent do you consider that the unit would be likely to promote student teacher attainment of its ascribed objectives?

Question 13.1

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

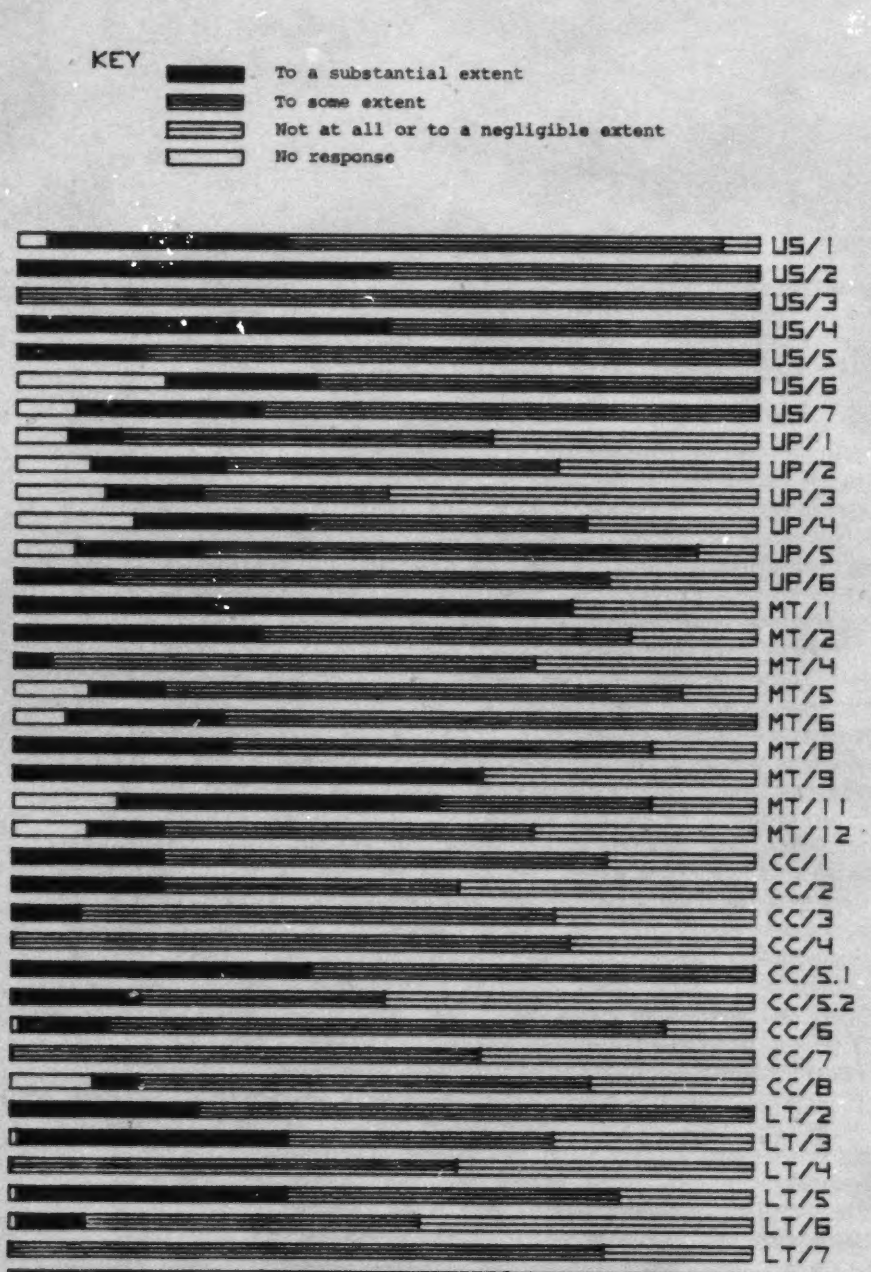
To feel that they will, in fact, cope in the classroom.



Question 13.2

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

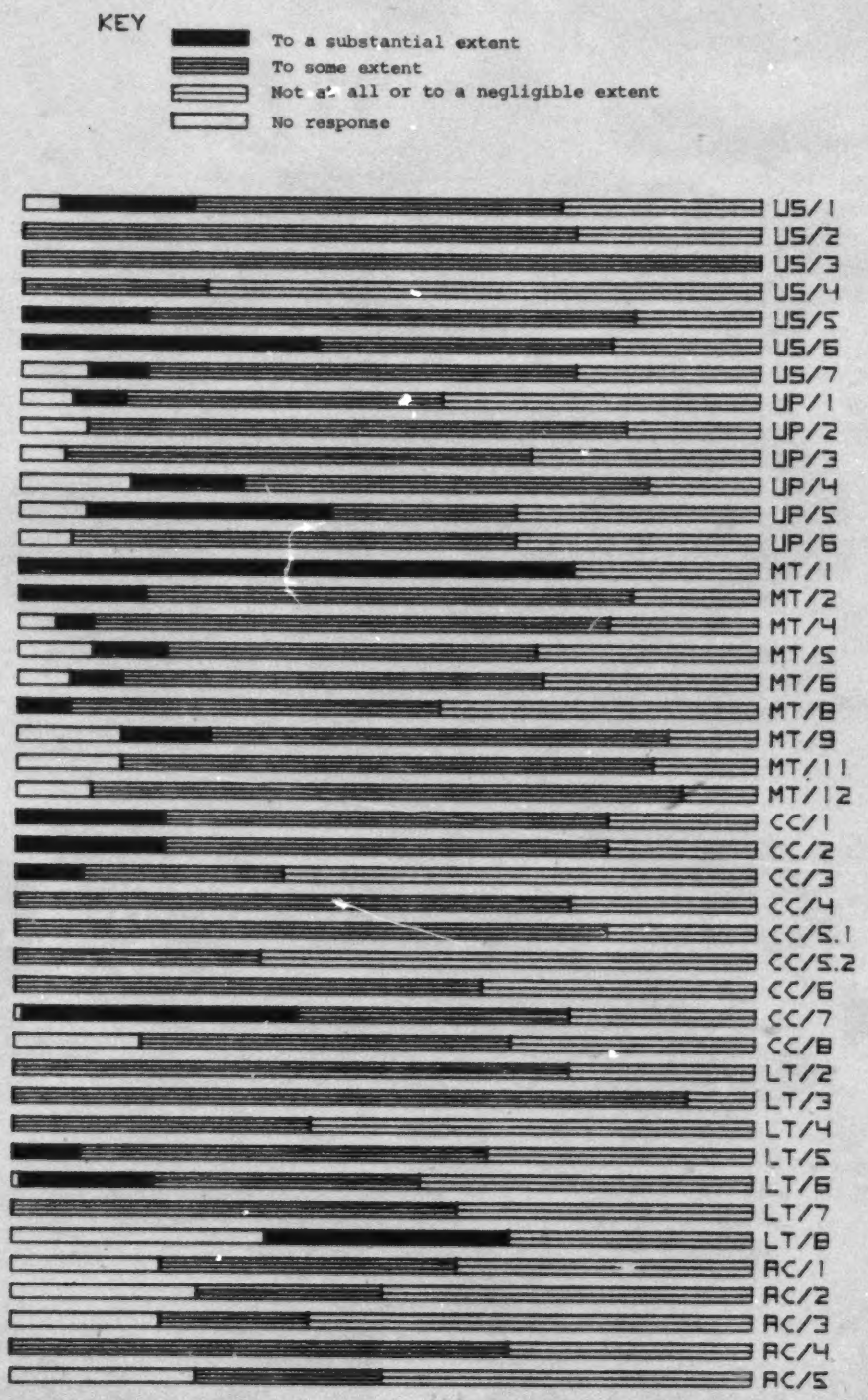
To explore their own capabilities.



Question 13.3

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

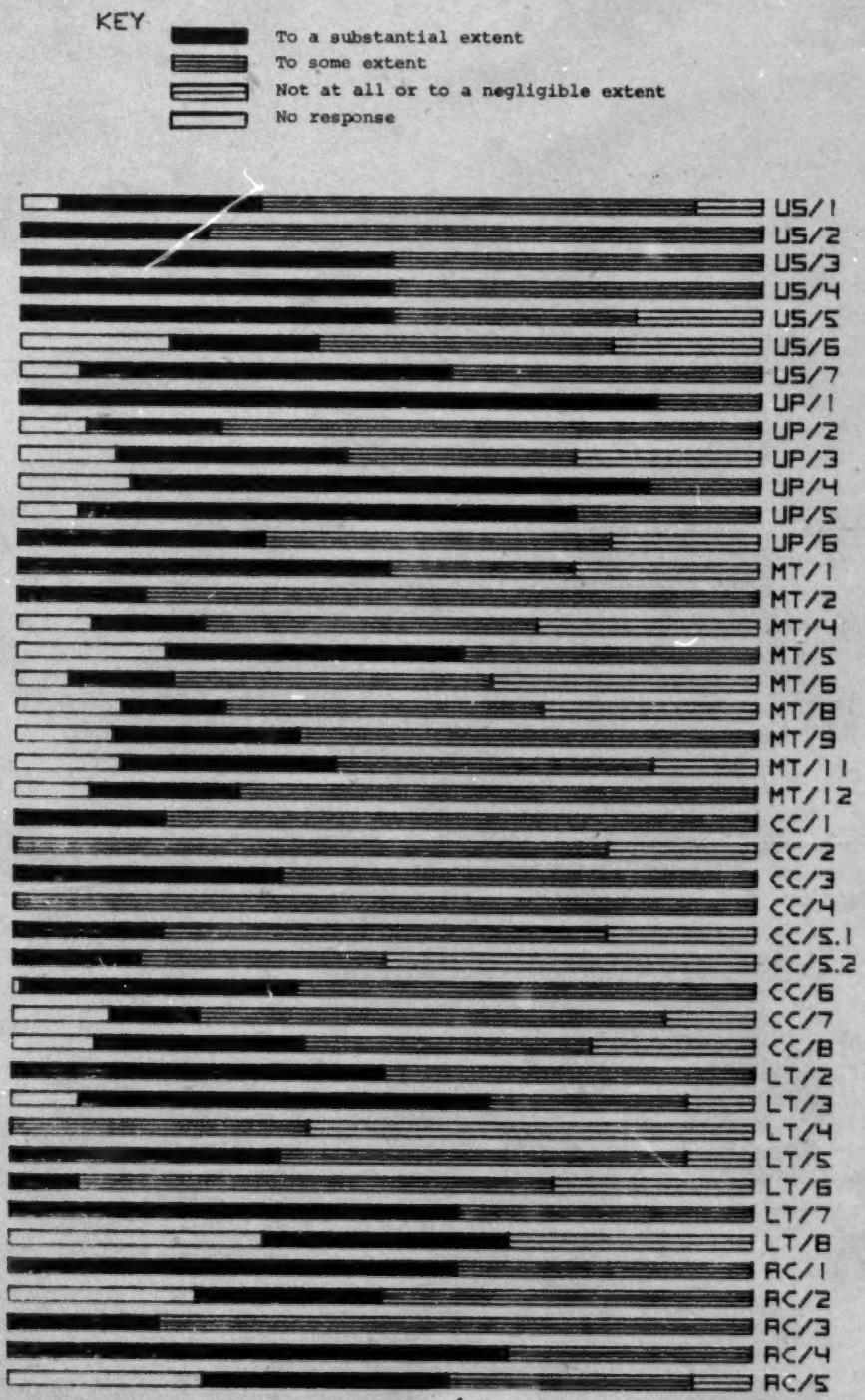
To feel they have achieved success (by their own standards).



Question 13.4

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To have new or fresh experience.



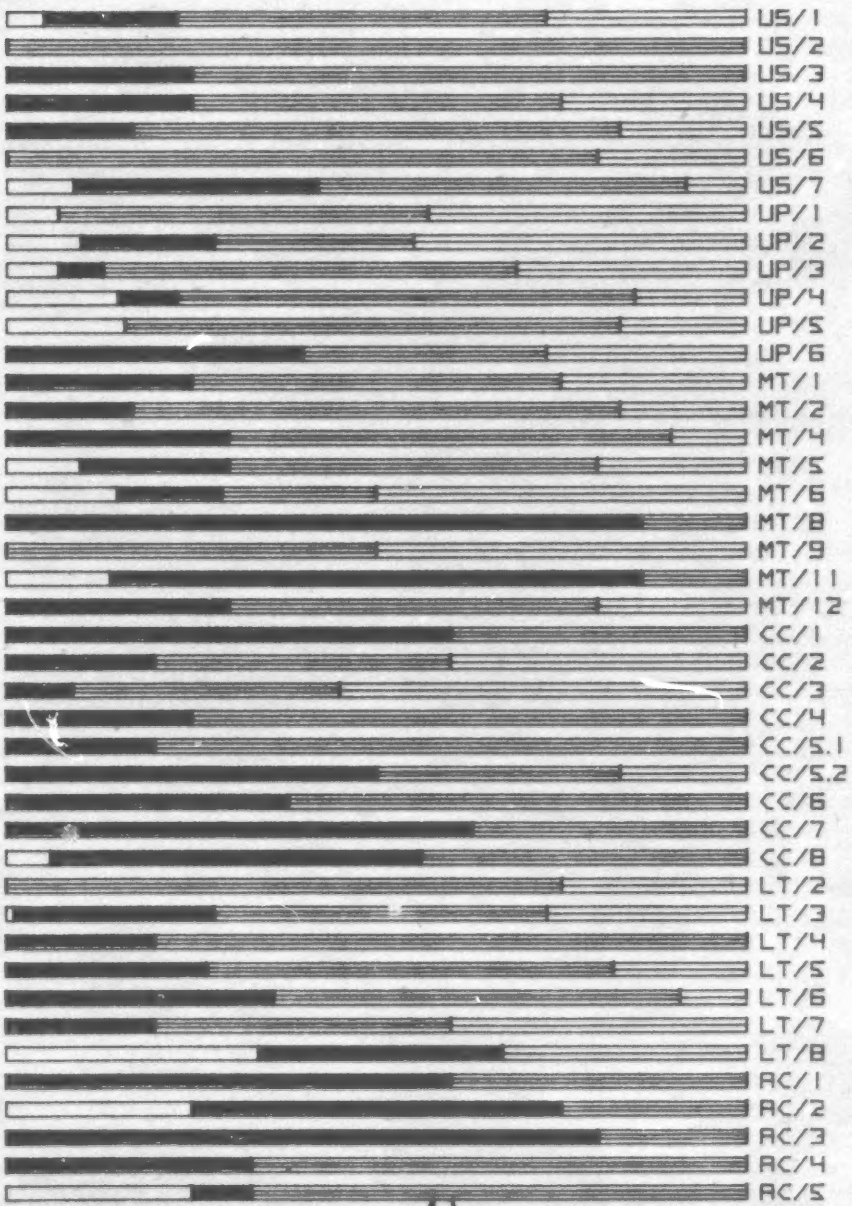
Question 13.5

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To sort out or express their own ideas or opinions.

KEY

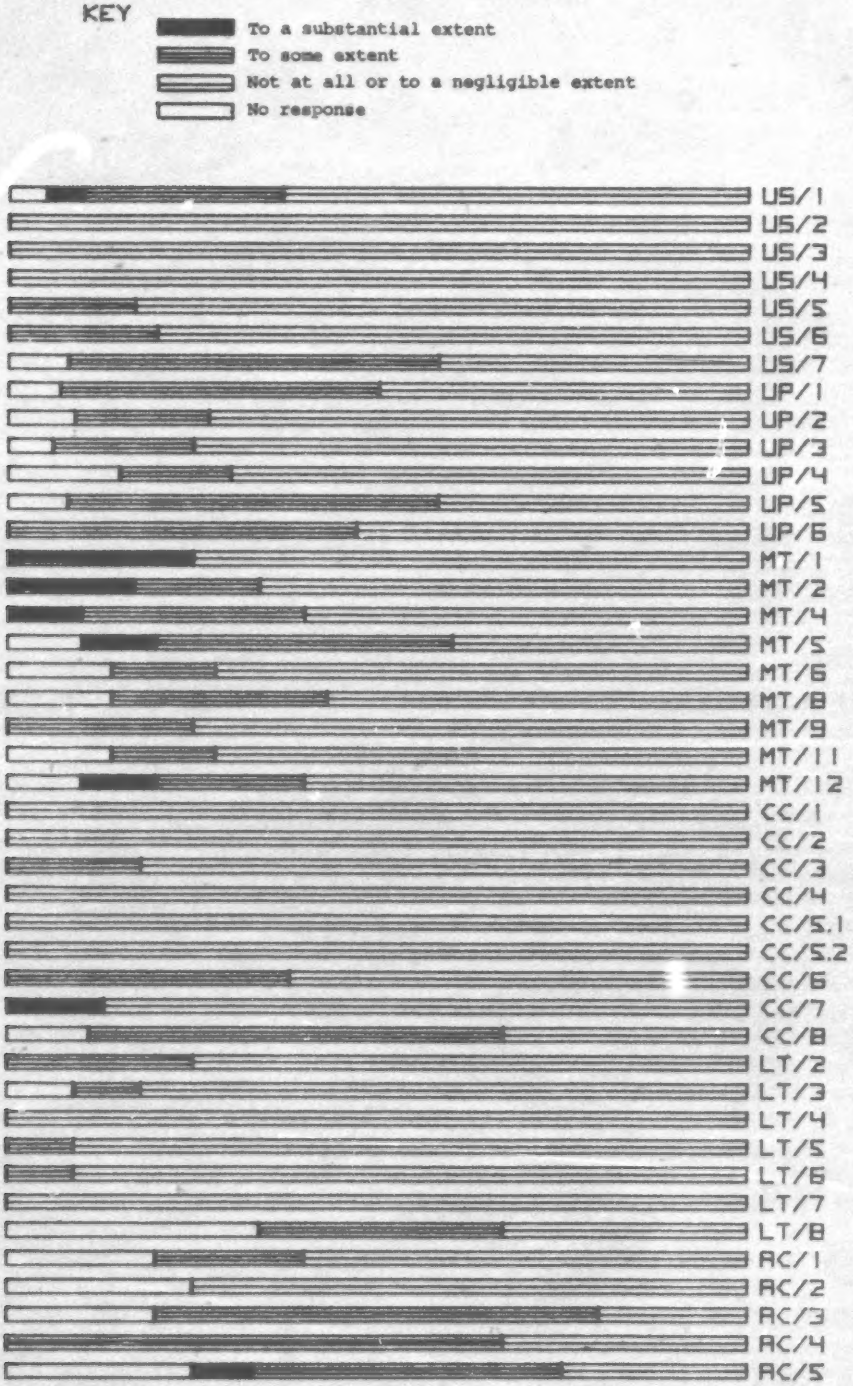
- To a substantial extent
- To some extent
- Not at all or to a negligible extent
- No response



Question 13.6

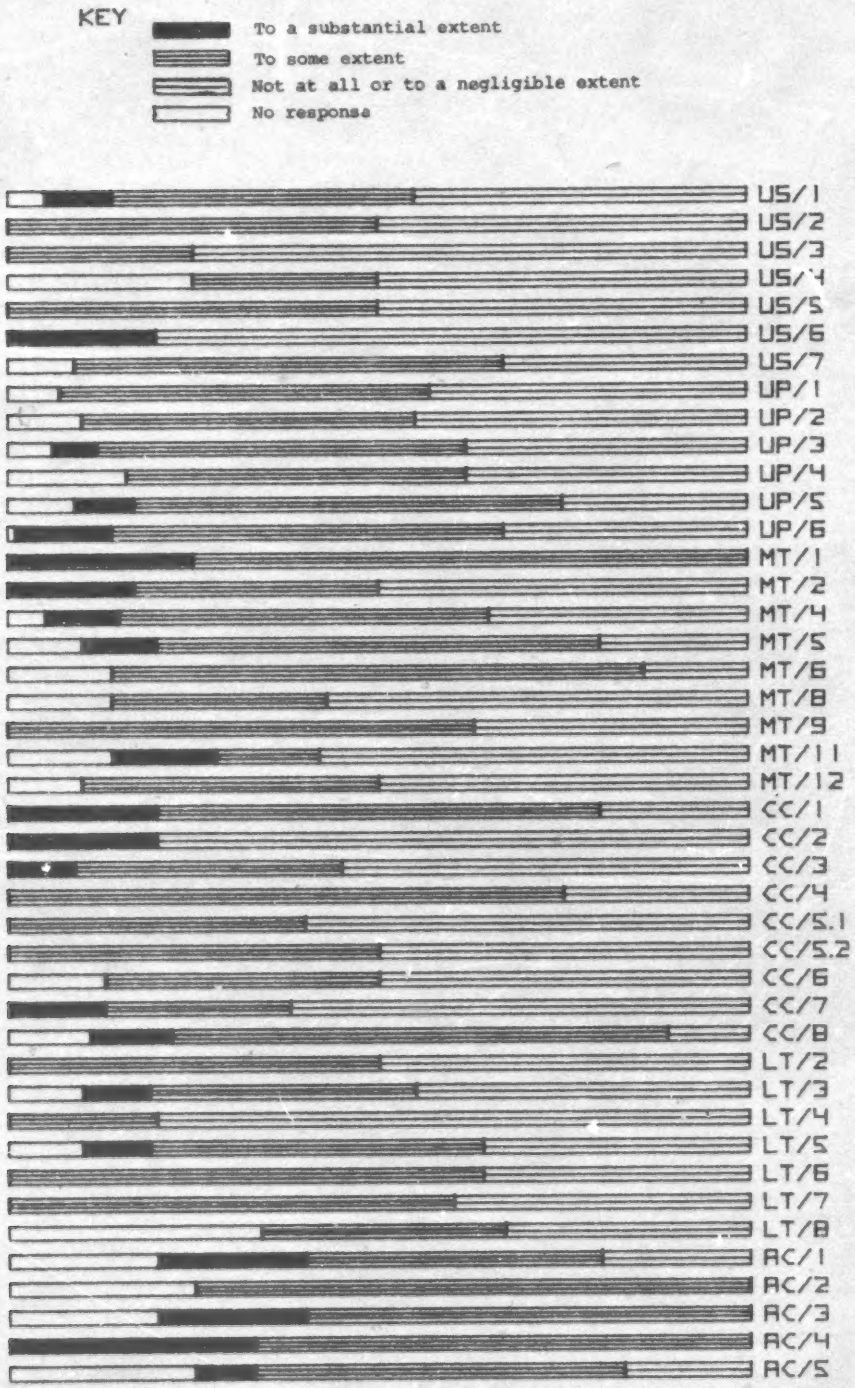
... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To be liked, to get on with others.



Question 13.7
... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

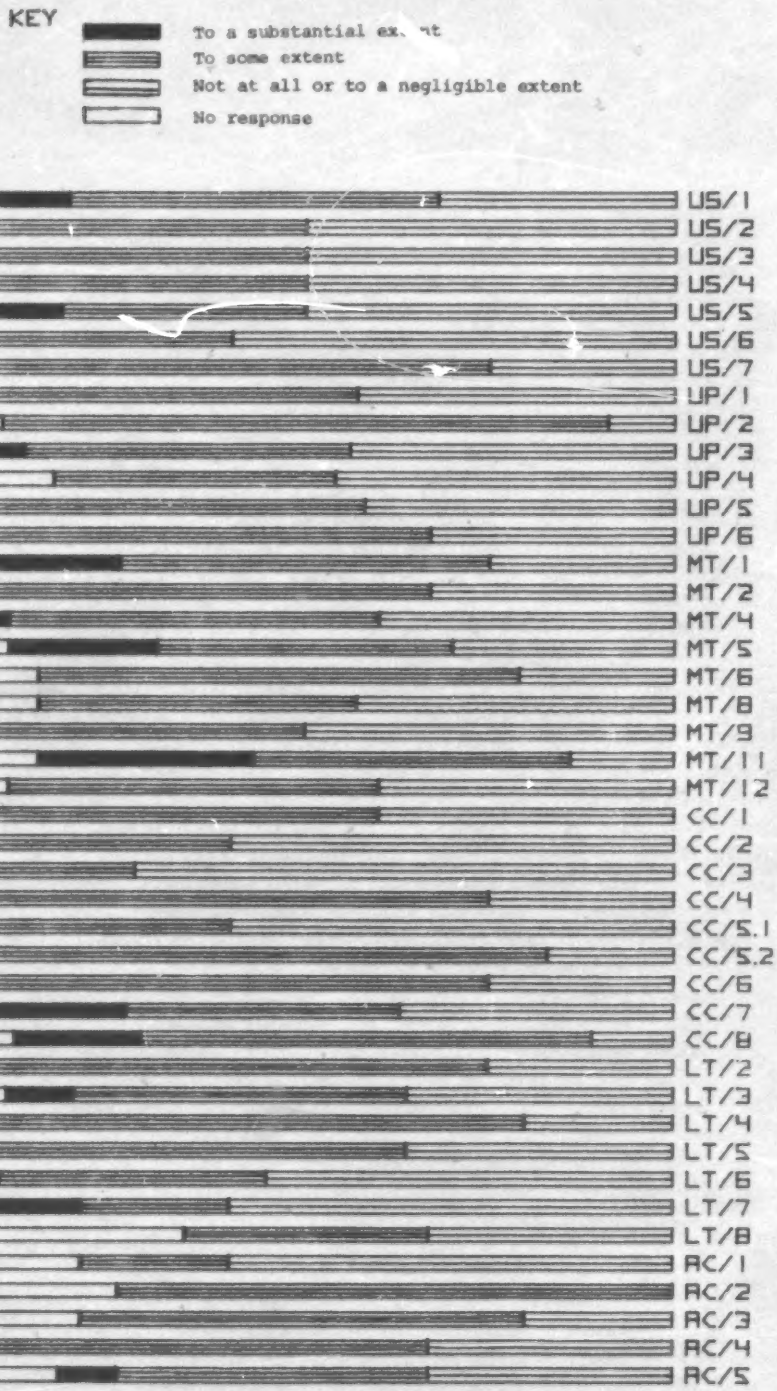
To help and be helped.



Question 13.8

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

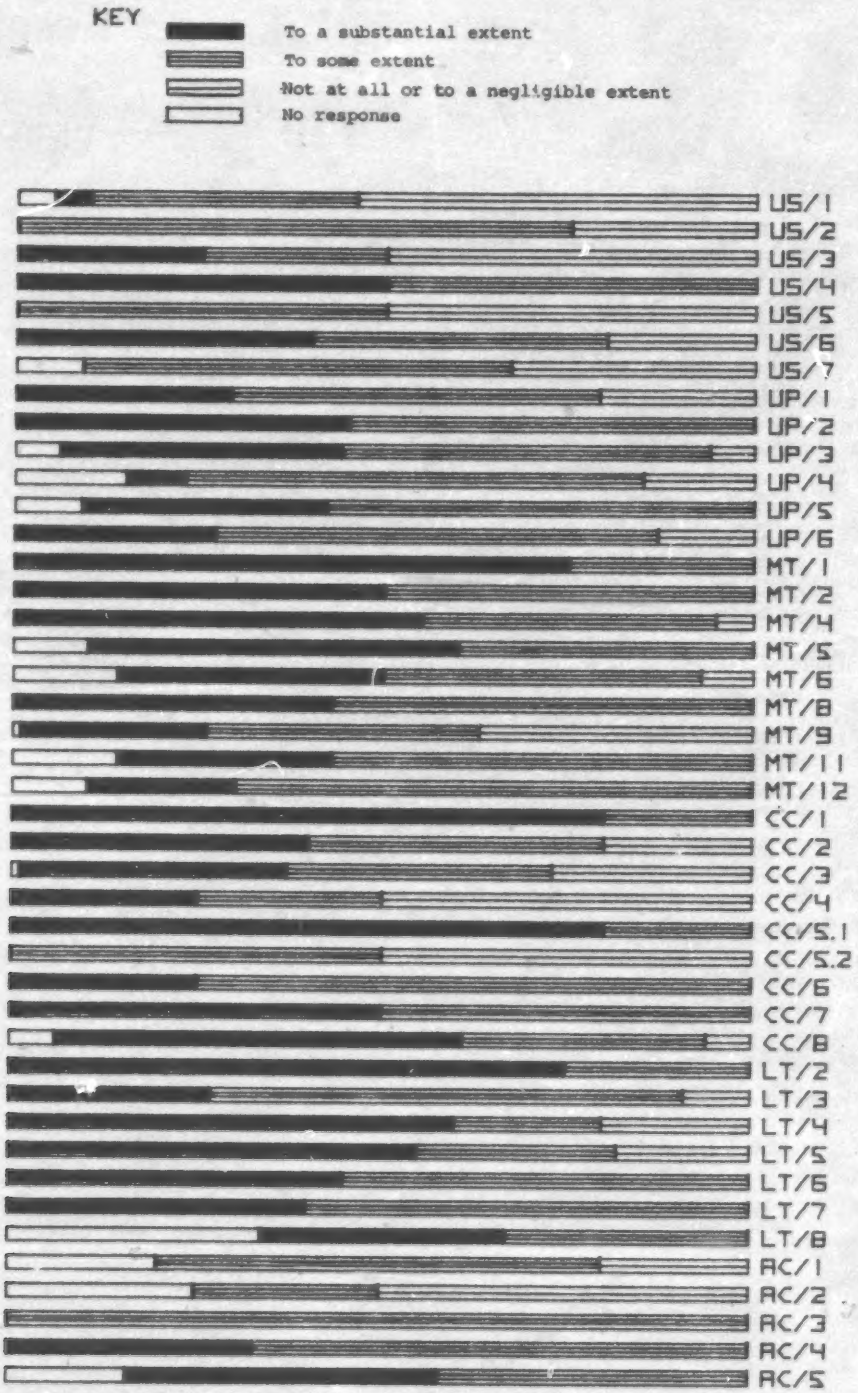
To feel that their own contribution is appreciated by others (method staff, peers, etc.)



Question 13.9

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To see themselves more clearly as teachers.



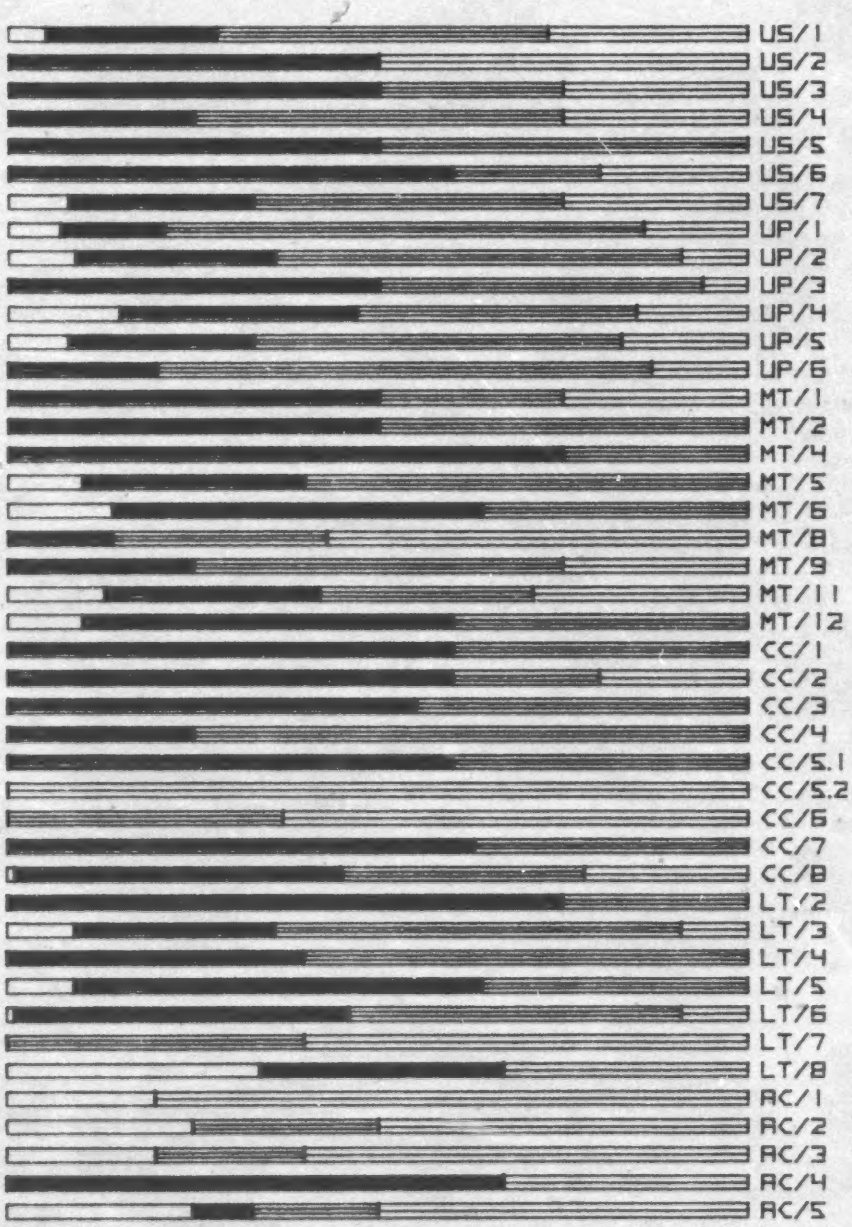
Question 13.10

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To feel they have gained practical teaching skills.

KEY

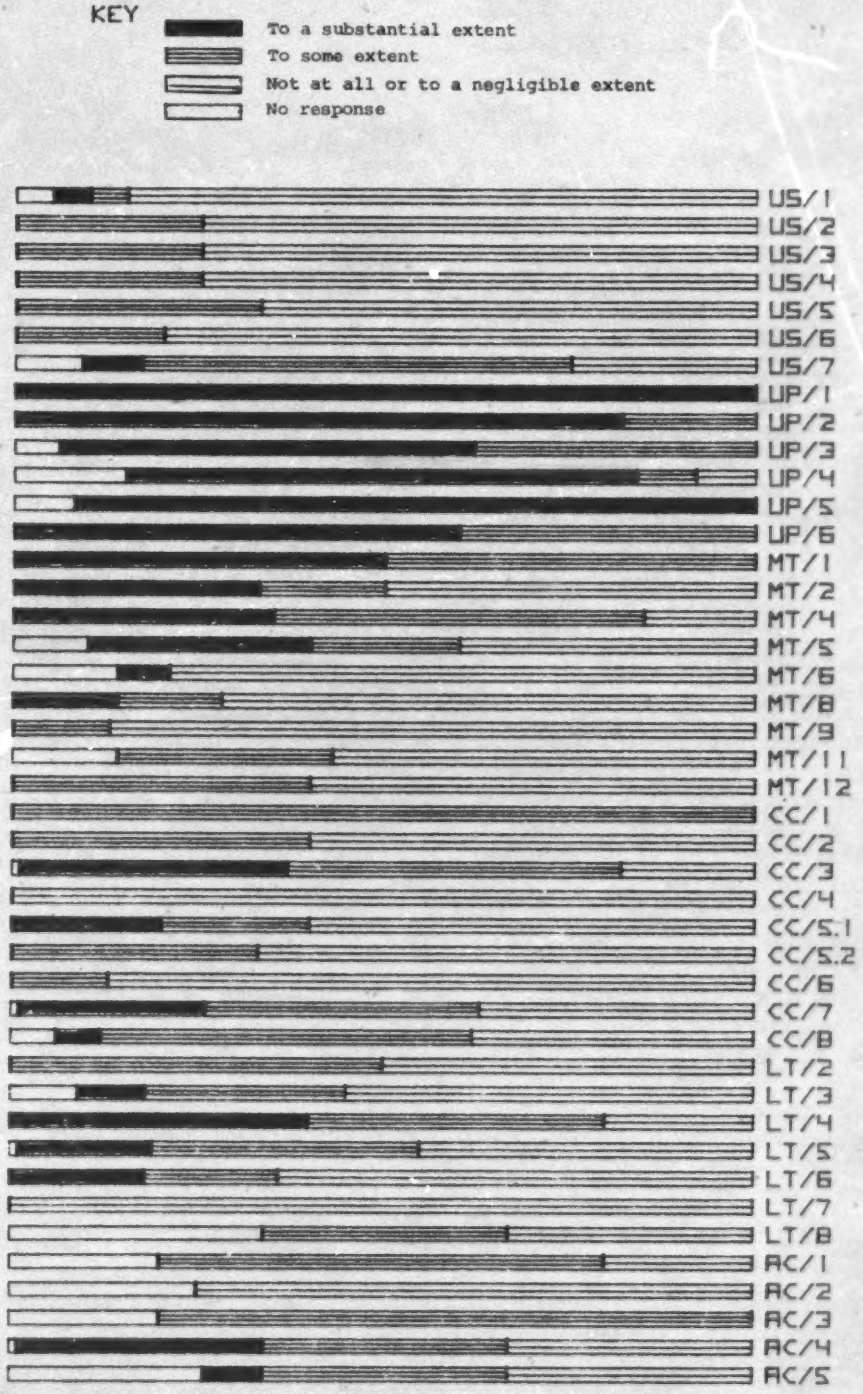
- To a substantial extent
- To some extent
- Not at all or to a negligible extent
- No response



Question 13.11

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

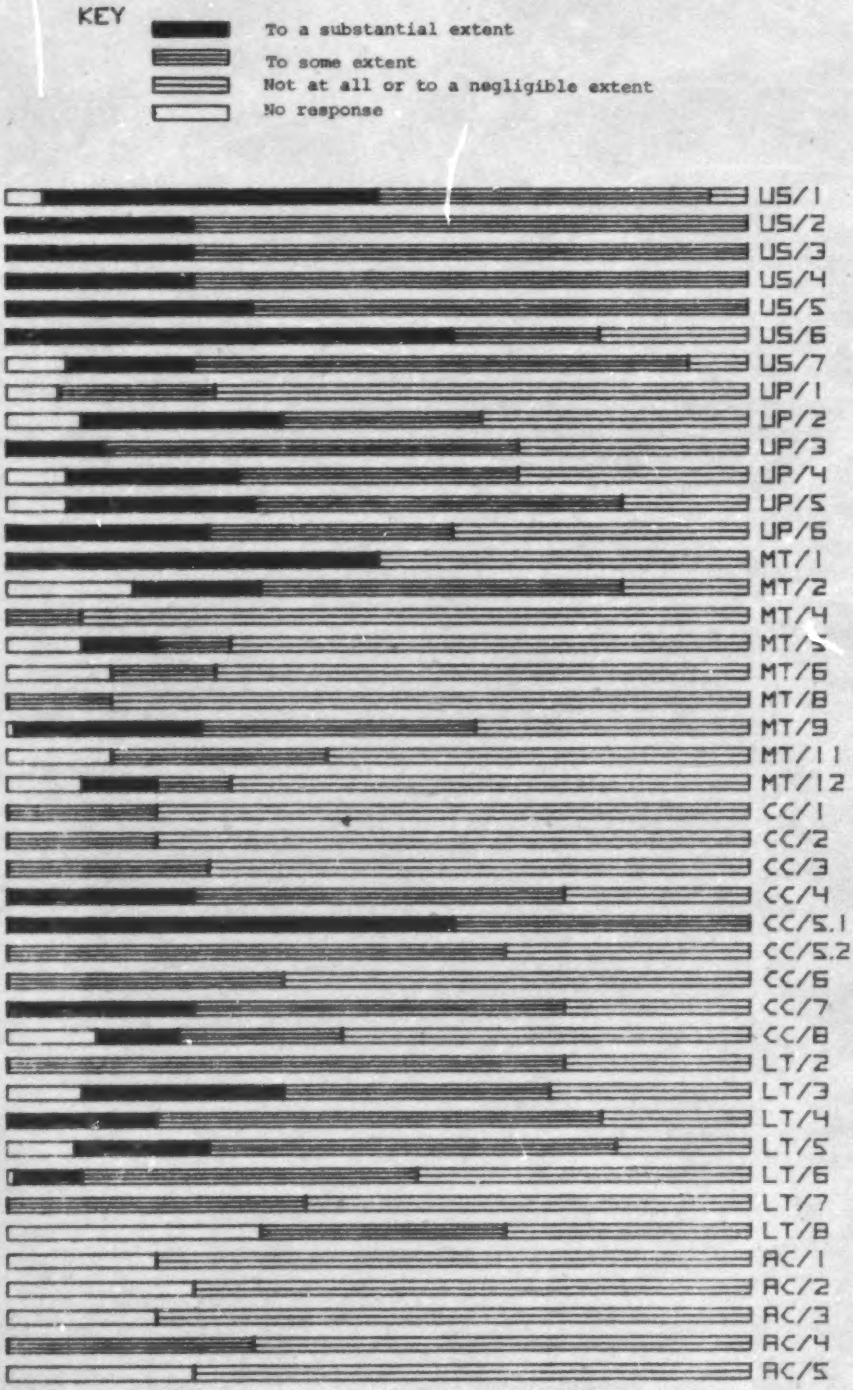
To feel they have developed relevant understanding of children.



Question 13.12

... indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement:

To feel they have developed relevant understanding of science.



SECTION 3: DIRECTORY OF STATED OBJECTIVES FOR ASTEP UNITS

Introduction

The whole set of 47 ASTEP Units is a formidable package of materials for teacher education. This section provides a directory to those materials in terms of a classified index of the stated objectives for each of the units.

Each of the stated objectives for the units has been classified in accord with the following classification scheme.

1. KNOWLEDGE ABOUT AND COMPREHENSION OF SCIENCE
   - 1a. Defining Variables
   - 1b. Observing and Using Data
2. KNOWLEDGE AND COMPREHENSION OF THE TEACHING OF SCIENCE
   - 2a. Objectives and their Role in Instruction
   - 2b. Learning Activities and their Selection
   - 2c. Materials and Equipment
   - 2d. Specific Elements of a Teaching Repertoire
   - 2e. Measurement and Evaluation
   - 2f. Children's Concept Development
   - 2g. Curriculum Development
3. MOTIVATION, ATTITUDES, VALUES, ETC.
   - 3a. Attitudes to Science
   - 3b. Attitudes to the Teaching of Science
   - 3c. Attitudes to Children
   - 3d. Attitudes to Curriculum and Curriculum Decision Making
   - 3e. Attitudes to Curriculum Materials and Particular Instructional Strategies
4. SOCIAL COMPETENCIES
5. EXPOSURE TO PARTICULAR EXPERIENCES
6. UNCLASSIFIED.

Within each category in the Directory of objectives provided in this Section, an attempt has been made to group and order the stated objectives so that similarities in objectives for different units are highlighted. For those objectives on which data is available on the extent of perceived contribution of the unit concerned to the attainment of the objective, the data is provided alongside the objectives. In using this data, the user should keep in mind the warning provided at the beginning of Section 2 that this data reflects not only the effectiveness of the unit, but also the score of the objectives.

Among the potential uses for this directory are the following:

- It provides the user with an opportunity to directly locate unit(s) with particular stated objectives which he considers important, or unit(s) with stated objectives in particular categories.
- It provides the user with an opportunity to identify unit(s) with objectives related to another unit which he may have used, or decided to use.

Comments on the usefulness of this directory and other uses of the directory would be appreciated by the author.

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
Given a classroom situation the student should be able to suggest lines of further investigation that would involve these and other processes.	CC/5	20	80	0	0
Given a classroom situation the student should be able to identify which scientific processes may be used in an investigation.	CC/5	40	60	0	0
2. KNOWLEDGE AND COMPREHENSION OF THE TEACHING OF SCIENCE					
2a. Objectives and their Role in Instruction					
The student will be able to explain why a given explicit performance objective offers more guidance for planning than a vague statement of intent.	MT/1	25	25	0	50
Given a variety of statements of intent the student will be able to identify those which include: a) an action verb; b) a desired standard of performance; c) conditions under which the ability is to be exhibited.	MT/1	50	0	0	50
The student will be able to propose and justify criteria to be employed in selecting objectives.	MT/2	66	17	0	17
Familiarity with certain curriculum materials. In particular, student teachers will be able to determine the objectives of the materials.	CC/7	75	25	0	0
The student should be able to suggest likely outcomes of selected "lessons" from published materials.	MT/3		NO DATA		
Given a statement of course aims and a topic for study the student will be able to derive appropriate lesson and/or unit objectives for pupils he is teaching.	MT/2	33	50	0	17
Given a general statement of intent the student will be able to derive from it performance objectives stated in acceptable form and with appropriate content generality.	MT/1	25	25	0	50
The student should be able to comment on such possible outcomes in terms of a set of aims.	MT/3		NO DATA		
2b. Learning Activities and their Selection					
The student teacher will select appropriate activities when planning curriculum units or lessons.	CC/1		NO DATA		
Development of a comprehensive approach to examination of curriculum materials.	CC/7		NO DATA		
The student teacher will be able to name and describe at least twelve distinct forms of learning activity.	CC/1		NO DATA		

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
1. KNOWLEDGE ABOUT AND COMPREHENSION OF SCIENCE					
1a. Defining Variables					
The unit should give students the opportunity to distinguish between independent and dependent variables.	UR/1	27	59	9	5
Students should be able to identify certain factors (variables) which must be held constant (controlled) if meaningful results are to be obtained.	UR/4	75	25	0	0
The students should be able to suggest variables which may control the time of a swing of a pendulum.	UR/5	100	0	0	0
The students should be able to control these variables in order to find which is operative.	UR/5	83	17	0	0
1b. Observing and Using Data					
The unit should give students the opportunity to gain further experience in defining concepts (density, viscosity), controlling relevant variables, quantification, and in the interpretation of data.	UR/1	54	32	9	5
The unit should give students the opportunity to formulate an hypothesis.	UR/1	36	59	0	5
The unit should give students the opportunity to recognize underlying assumptions.	UR/1	18	50	27	5
Students should be able to state the type of data required to solve a particular problem.	UR/4	25	75	0	0
The student should be able to design an experiment from which the length of a pendulum that beats seconds may be predicted.	UR/5	83	17	0	0
Students will be able to devise methods of observing, measuring and recording the behaviour of small animals.	UR/6	100	0	0	0
Students will be able to design an experiment to measure the response of a small animals to a stimulus.	UR/6	60	40	0	0
Students should be able to devise a simple scheme of classification and nomenclature based on the observable attributes of a collection of rock specimens.	CC/4	75	25	0	0
Students should be able to identify a foreign specimen in terms of the classification scheme devised.	CC/4	75	25	0	0
Students will be able to compare their efforts with those of others (described in a published report).	UR/6	0	80	20	0
Students should understand and accept that data collected must be organised in some way if trends are to be seen or interpretations made.	UR/4	75	25	0	0
The unit should give students the opportunity to consider the problem of experimental error.	UR/1	27	54	13	5
The unit should give students the opportunity to extrapolate from data.	UR/1	22	68	5	5

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
The student teacher will be able to predict (in general terms) the likely efficiency of a specified learning activity for achieving a given objective.	CC/1	NO DATA			
Students should be able to distinguish from their experience in the workshop between the use of these materials to teach established facts of human behaviour and to teach scientific processes like hypothesising, designing experiments, controlling variables, etc.	UE/7	17	50	17	8
Students should determine for themselves the relative merit of these materials for achieving the preceding objective compared with materials drawn from, say, chemistry or physics.	UE/7	17	50	25	8
The student teacher will be able to state and justify criteria to be employed in selecting learning activities.	CC/1	NO DATA			
The student teacher will be able to suggest suitable activities for achieving given objectives and justify the choices made.	CC/1	NO DATA			
To encourage student teachers to develop a sound strategy for choosing curriculum materials. In particular, this will involve use of certain criteria against which the choice of materials may be judged.	CC/8	50	33	0	17
To encourage student teachers to develop a sound strategy for choosing curriculum materials. In particular, this will involve a knowledge of the particular characteristics of the materials being considered.	CC/8	39	50	6	6
Familiarity with certain curriculum materials. In particular, student teachers will be able to identify the types of learning situation used to achieve the objectives of the materials.	CC/7	75	25	0	0
Familiarity with certain curriculum materials. In particular, student teachers will be able to identify the major strengths and weaknesses of the materials.	CC/7	75	25	0	0
Familiarity with certain curriculum materials. In particular, student teachers will be able to make some evaluation of the feasibility of using the materials in the classroom as they know them.	CC/7	62	25	12	0
That students become familiar with the way some materials (Sc 5/13 or A.S.E.P.) take account of the stages of intellectual development to be found at any time in any upper primary or lower secondary class.	UP/3	44	50	0	6

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
2c. Materials and Equipment					
Students should be able to organise and prepare materials required for use in class.	CC/2	60	40	0	0
Students should be familiar with and be able to use, the type of information contained in catalogues.	CC/6	50	50	0	0
Students should be able to use chemical and equipment catalogues.	LT/7	60	40	0	0
Students should be able to cope with problems associated with purchases of chemicals and equipment (pack size, availability, price variation).	LT/7	0	100	0	0
Students should be aware of the type of data needed to write an order for equipment (including correct name of item - identification number in catalogue etc.).	LT/7	80	20	0	0
Students should understand problems associated with stocktaking.	LT/8	0	67	0	33
Students should realise that one has to consider the work programme when thinking of storage.	LT/8	33	33	0	33
Students should be able to cope with the special problems associated with the storage of dangerous, attractive and valuable items.	LT/8	33	33	0	33
Student teachers should be able, during Practice Teaching to analyse present and suggest additional use of resources through certain structured activities.	LT/9	NO DATA			
Student teachers should be able, during Practice Teaching to collect information on resources and activities relevant for science teaching in the school and community.	LT/9	NO DATA			
Students should have a knowledge of a variety of ways of effecting rapid distribution of equipment in laboratories.	CC/2	20	60	20	0
2d. Specific Elements of a Teaching Repertoire					
To introduce the concept of teaching styles (which may be developed further in a later unit).	MT/5	0	70	30	
That students should describe circumstances in which differing teaching roles might be appropriate.	MT/7	NO DATA			
To assist student teachers to identify their initial teaching styles.	MT/5	28	14	14	

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
The unit is designed to assist students understand the importance of the early part of a lesson.	MT/4	35	60	0	5
The student should be able to devise and pose a variety of questions.	MT/6	14	79	7	0
The student should be able to analyse critically the questions of others.	MT/6	14	79	7	0
The student should be able to use a visual aid in teaching.	MT/6	7	86	7	0
To help the students judge the degree to which he can recognise potentially unsafe situations.	LT/6	27	64	9	0
To give students experience with devising and testing material designed to teach a concept.	UP/4	31	46	0	23
To give students experience in devising and selecting classroom activities which cater for a grade containing pupils who could be broadly classified as in Piaget's pre-operational and early concrete stages of intellectual development.	UP/2	36	64	0	0
That students be able to plan a classroom topic for an upper primary or lower secondary class in which provision is made for intellectual development ranging from the concrete to the formal stage.	UP/3	12	63	19	6
The student teacher will be able to explain how "intuition-offending situations" may be used to establish "a need to know".	LT/1	NO DATA			
The student teacher will be able to plan effective lesson, topic or unit introductions based on a given intuition-offending technique.	LT/1	NO DATA			
The student teacher will be able to devise suitable intuition-offending techniques for use in his/her own teaching.	LT/1	NO DATA			
Students should be able to develop problem situations in geology using a variety of resources.	MT/9	25	62	0	12
The student should be able to apply readability formulae to junior and senior science written materials according to their reading difficulty.	CC/3	82	9	0	9
2e. Measurement and Evaluation					
Familiarity with certain curriculum materials. In particular, student teachers will be able to determine the methods used to assess the progress of pupils.	CC/7	75	25	0	0
After completion of the unit students should be able to identify types of practical skills and abilities.	LT/3	64	18	9	9

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
After completion of the unit students should be able to identify practical skills and abilities which can be assessed by means of a formal practical test.	LT/3	64	18	9	9
After completion of the unit students should be able to construct some practical test items.	LT/3	45	36	9	9
After completion of the unit students should be able to plan the way in which a practical test should be administered in a specific situation.	LT/3	27	55	0	18
At the completion of this unit students should be able to formulate a number of objectives for recording laboratory work.	LT/4	40	60	0	0
At the completion of this unit students should be able to use laboratory reports as a part of the continual assessment of pupils work.	LT/4	40	40	20	0
At the completion of this unit students should be able to use a variety of criteria in assessing laboratory reports.	LT/4	40	40	20	0
At the completion of this unit students should be able to devise a number of alternative methods of recording laboratory work in accordance with the age and ability of their pupils.	LT/4	0	60	40	0
At the completion of this unit students should be able to detect individual and class difficulties which may be apparent in laboratory reports.	LT/4	40	40	20	0
An ability to use the technique of impression marking.	MT/12	30	60	10	0
An ability to use a structured mark scheme.	MT/12	40	60	0	0
The student should be able to use valid test items to diagnose sources of vocabulary difficulty.	CC/3	27	36	27	9
To provide an opportunity for the student teacher to plan an interview schedule with appropriate questions to test pupils' understanding.	UP/5	67	8	0	25
To become familiar with some simple schemes for observing science lessons to some purpose.	MT/5	50	30	0	20
2f. Children's Concept Development					
To develop students' understanding of the individual nature of concepts.	UP/4	54	15	8	23
To gain a clearer understanding of the way in which different pupils think about the science concepts presented.	UP/5	83	8	8	0
To gain a clearer understanding of pupils' use of terms which have a technical meaning to the scientist.	UP/5	50	50	0	0

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
3g. Curriculum Development					
Acquisition of some understanding of how a curriculum is developed.	CC/7	NO DATA			
Students should be able to list and discuss the processes of science as determined by a curriculum development group.	CC/5	NO DATA			
Students should be able to discuss the key ideas associated with teaching science by a process approach.	CC/5	NO DATA			
Familiarity with certain curriculum materials. In particular, student teachers will be able to investigate the extent to which the materials were trialled during and after their development.	CC/7	62	25	12	0
3. MOTIVATION, ATTITUDES, VALUES, ETC.					
3a. Attitudes to Science					
Students should realise the need to define the relevant concepts when beginning an investigation.	US/4	25	75	0	0
Students should accept the need for quantification of data where appropriate.	US/4	25	75	0	0
Students should realise that conclusions drawn may need to be modified in the light of new evidence, or be restricted to a particular set of conditions.	US/4	25	50	25	0
This unit is designed to focus students attention on characteristics of observation and the differences between observations and inferences.	US/3	75	25	0	0
Students will be aware of the problem of sampling in some scientific experiments.	US/6	[illegible]	80	0	20
Students will be aware of the need to interpret data within the context of the sampling used, the numbers of trials and the probability that any difference in behaviour noted may have arisen by chance.	US/[illegible]	40	40	20	0
This unit is designed to focus students' attention on the arbitrary nature of the property selected as a basis for classification and the range of classification schemes possible.	US/3	75	25	0	0
3b. Attitudes to the Teaching of Science					
That students should perceive factors which can contribute to such a smoothly running classroom and identify factors which are within the province of a teacher's influence.	MT/7	NO DATA			

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
To begin to develop an awareness of the types of interactions which occur in science classrooms.	MT/5	60	20	0	20
To encourage student teachers to evaluate their teaching styles in terms of their effects on pupils.	MT/8	NO DATA			
To give student teachers confidence to modify aspects of teaching style which they see as requiring some change.	MT/8	NO DATA			
Students should recognise the need for careful, advanced organisation and preparation of materials.	CC/2	40	60	0	0
To encourage student teachers to seek methods of dealing with the teaching of unfamiliar material.	LT/2	0	75	0	25
Students should realise that it is possible to contribute through science lessons with these materials to the awareness the students have of themselves - a major goal of many general education programmes.	US/7	42	25	8	25
3c. Attitudes to Children					
Develop an awareness of differences in pupils' thinking and possible reasons for these differences.	UP/6	40	40	13	7
To foster student's awareness of the need to cater for the likely range of intellectual abilities in Grades K-2.	UP/2	73	27	0	0
That students become aware of the need to cater for children at different stages of intellectual development in upper primary and lower secondary classes.	UP/3	56	31	6	6
At the completion of this unit, students should be aware of qualitative differences in the thinking and reasoning abilities of children at different ages and stages.	UP/1	93	7	0	0
At the completion of this unit, students should be prepared to regard differences in children's logical abilities objectively and diagnostically, rather than responding with value judgements of relative superiority or inferiority.	UP/1	43	57	0	0
To encourage student teachers to consider the appropriateness of learning experiences and subject material in terms of different student ages.	LT/2	75	25	0	0
This unit is designed to enable the student to isolate factors that have been responsible for the formation of particular attitudes.	AC/3	40	60	0	0
The student should be aware of procedures and materials which will minimise reading and vocabulary difficulties and so prevent them from being obstacles to pupils' learning.	CC/3	18	55	18	9

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R

3d. Attitudes to Curriculum and Curriculum Decision Making

The student should be able to develop an awareness of differences in specific objectives within and between different sources of curriculum materials.	MT/3	NO DATA			
To encourage student teachers to develop a sound strategy for choosing curriculum materials. In particular, this will involve a recognition that evaluation of material involves a series of value judgements which reflect the personal attributes and attitudes of the teacher.	CC/8	33	33	17	17
To encourage student teachers to develop a sound strategy for choosing curriculum materials. In particular, this will involve (frequently) the ability to work with one or more other science teachers in making decisions.	CC/8	28	33	6	33
Students should have appreciation of the decision making processes in a science department.	CC/6	12	75	12	0
Students should be aware of the existence of constraints in modifying courses (e.g. money).	CC/6	75	25	0	0
Students should become aware of the fact that a number of secondary science curriculum materials now have units that draw their investigations from experimental psychology.	UB/7	50	25	17	8

3e. Attitudes to Curriculum Materials and Particular Instructional Strategies

Students should be aware of the range of materials that can be drawn on, for use in a section of work.	CC/2	20	60	20	0
To further students' awareness of some of the strategies which can be used to develop concepts.	UP/4	23	54	0	23
Students should be aware of the educational possibilities of games.	MT/10	NO DATA			
Students should be introduced to the idea that games provide concrete experiences which may facilitate the development of concepts to a wider audience than might otherwise be possible using conventional approaches i.e. to link with educational psychology.	MT/10	NO DATA			
Students should be introduced to the notion that games can be simple models (simulations) of real systems i.e. link with previous understanding of the nature of scientific models.	MT/10	NO DATA			
To focus students attention on the ways in which everyday materials from the pupils environment can be used as sources of science activities.	US/2	50	50	0	0

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R

Students should be aware of the variety of possible uses of resource materials in geological teaching.	MT/9	17	25	25	12
Students should appreciate by their own reaction, that these materials (units that draw their investigations from experimental psychology) have high intrinsic motivation.	US/7	42	33	17	8
To encourage student teachers to acquire a habit of considering the potential of a laboratory exercise in terms of recognising that one single exercise may be validly used in a number of different contexts, each involving different concepts.	LT/2	50	50	0	0
To encourage student teachers to acquire a habit of considering the potential of a laboratory exercise in terms of recognising that one single exercise may be validly used to lead into any one of a number of areas.	LT/2	50	50	0	0
To make students more aware of the potential dangers in a variety of practical situations.	LT/5	73	0	9	18
To make student teachers more aware of the potential dangers in a variety of practical situations with a view to preventing accidents.	LT/6	55	45	0	0
Students should recognise the need for a detailed analysis of a section of work with respect to equipment and materials.	CC/6	50	50	0	0
Students should be aware of the need for a workable "goods received" procedure.	LT/7	40	40	0	20
Students should be aware that there are a number of satisfactory systems of storage of equipment.	LT/8	67	0	0	33
Awareness of the problems involved in making a subjective judgement of extended response answers to questions.	MT/12	90	10	0	0

4. SOCIAL COMPETENCIES

The purpose of this unit is to enable students to identify the processes involved in a possible conflict situation.	AC/4	33	67	0	0
The purpose of this unit is to enable students to increase skill in making constructive responses in a confrontation.	AC/4	100	0	0	0
The purpose of this unit is to enable students to increase skill in modifying and influencing opinions of others in a constructive way.	AC/4	33	67	0	0
This unit is designed for students to learn the range of views held by members of the group.	AC/2	50	25	0	25

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
This unit is designed for students to discover clearly their own position in the continuum of opinions.	AC/2	25	50	0	25
This unit is designed for students to attempt by peer group discussion to reduce prejudice against views different from their own and thus increase understanding and toleration of other's viewpoints.	AC/2	50	25	0	25
This unit is designed for students to reduce defensiveness in discussions of the topic.	AC/2	25	50	0	25
The teacher should be able to analyse the natural framework from which he engages in oral communication with parents.	AC/5	0	83	8	8
The teacher should be able to list enough of aspects of parent's natural framework for such a relationship.	AC/5	17	75	0	8
The teacher should be able to identify and list differences between his frame of reference and those of typical parents.	AC/5	42	50	0	8
The teacher should be able to suggest questions and styles of oral communication that will narrow these differences.	AC/5	8	67	17	8
This unit is designed to enable the student to assess the reliability of some sources of information in forming attitudes.	AC/3	20	60	20	0
This unit is designed to enable the student to discuss the basis of his own attitudes to the chosen issue.	AC/3	60	40	0	0
This unit is designed to enable the student to consider the role of a teacher during a class discussion of a controversial issue.	AC/3	40	60	0	0
5. EXPOSURE TO PARTICULAR EXPERIENCES					
To involve students directly in experiences of many skills that may be largely foreign to them.	US/2	50	50	0	0
Give student teachers direct experience in interacting with pupils.	UP/6	67	20	7	7
That students should observe an example of a smoothly running activity based classroom.	MT/7	NO DATA			
That students should observe some possible roles which may be adopted by a teacher in an activity based classroom.	MT/7	NO DATA			
Students should consider ways of involving pupils in geological inquiry in the classroom.	MT/9	37	50	0	12
Students should observe student-teachers reaction to playing games (the teacher's attitude is often critical in determining the outcome of classroom games).	MT/10	NO DATA			

Stated Objectives	Unit	Percentage of evaluators who considered this unit contributed to the attainment of this objective: To a substantial extent	To some extent	Not at all or to a negligible extent	N/R
Students should be given an opportunity to analyse a situation and develop a simulation game based on the understanding of that system.	MT/10	NO DATA			
The unit is designed to provide opportunities to discuss different ways of introducing lessons.	MT/4	60	25	0	15
To record student teachers' initial assumptions and attitudes.	MT/11	57	14	0	29
To introduce some of the issues to be dealt with in later sessions.	MT/11	43	29	0	29
To provide some initial experience in choosing with others, the materials to be used in teaching a particular topic.	CC/8	61	28	0	11
The unit is designed to stimulate thinking about selected controversial issues.	AC/1	60	40	0	0
The unit is designed to provide a means for students to respond as individuals to the issues raised (selected controversial issues).	AC/1	60	40	0	0
The unit is designed to assist students clarify the values they hold in relation to those issues (selected controversial issues).	AC/1	60	40	0	0
6. UNCLASSIFIED					
The purpose of this unit is to enable students to assess the relevance of this and other units in the area to the classroom situation.	AC/4	0	100	0	0
Student teachers should be able, during Practice Teaching to investigate issues identified in the training programme.	LT/9	NO DATA			

APPENDIX A

ASTEP

FINAL EVALUATION SHEET FOR A.S.T.E.P. UNITS (1975)

Name of Unit ——————————

Office use only

1	2	3	4

Instructions for completing this evaluation sheet

In most cases your replies will be made on the basis of reading the unit only. In some cases it may be possible to respond after trialling some or all of the unit with a group.
In some questions you will be required to select from a range of possible responses the one which best describes your view on the unit. On these questions, indicate your choice by ticking the box corresponding to the most appropriate response. In other questions you will be asked to write comments in the spaces provided.

Please do not hesitate to make any other comments that you consider relevant in the space provided at the end of the questionnaire. Your comments will be very valuable at this final stage of the project. If the space provided is insufficient, please attach an extra sheet. You may find it convenient to write other comments and any corrections on the unit itself, and to return the unit along with this form. In this case, we would be happy to supply you with another copy.

-- o o 0 o o --

1. Would you be likely to use the unit in one or more of your courses?

Office use only

I would certainly include it in my course. ☐ 1

I would try to include it in my course if time could be found. ☐ 2

I would not include it in my course. ☐ 3

I would include it in my course with some modification (see item 12 to explain modification) ☐ 4

I would include it in my course, but only for some students. ☐ 5

(If so, please specify which students .....

.....

.....)

5

55

2. If you were in a position to use the unit next year (and wished to do so), in which one or more of the following courses would you offer it?

Office use only

Dip. Ed. or equivalent post-graduate course	☐ 1
Undergraduate course for primary students:	
first year	☐ 2
second year	☐ 3
third year	☐ 4
fourth year	☐ 5
Undergraduate course for secondary students:	
first year	☐ 6
second year	☐ 7
third year	☐ 8
fourth year	☐ 9
Other (please specify)	☐ 0

6

3. When in the year would you be likely to use the unit?

In the first third of the year	☐ 1
In the middle third of the year	☐ 2
In the last third of the year	☐ 3

7

4. At what stage/s of a student teacher's training do you consider the unit would be most effective or useful?

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5. How useful do you consider the unit would be for the in-service training of science teachers?

Extremely useful	☐ 1
Of some use	☐ 2
Of very little or no use	☐ 3

8

6. To what extent do you consider that the unit would be likely to motivate your student teachers?

Not at all ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 very much

9

7. How important do you consider the objectives (both stated and implied) of the unit?

Office use only

Essential objectives in a course for student teachers in science	1
Important, but not essential objectives in a course for student teachers in science.	2
Interesting objectives, but of low priority in a course for student teachers in science	3
Of little or no importance or interest in a course for student teachers in science	4

10

8. In general terms, to what extent do you consider that the unit would be likely to promote student teacher attainment of its ascribed objectives?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Not at all — Very much

11

9. Only answer this question if the unit has a list of stated objectives.

Consider each of the stated objectives in turn. Write the number or label of this objective in the left-hand column below and indicate the extent to which you consider that the unit is likely to contribute to the attainment of this stated objective.

Number or label of the stated objective	Extent to which unit is likely to contribute to attainment of this objective			
	Not at all or to a negligible extent	To some extent	To a substantial extent	
	☐ 1	☐ 2	☐ 3	12
	☐ 1	☐ 2	☐ 3	13
	☐ 1	☐ 2	☐ 3	14
	☐ 1	☐ 2	☐ 3	15
	☐ 1	☐ 2	☐ 3	16
	☐ 1	☐ 2	☐ 3	17

10. Are there any other objectives which are likely to be attained using this unit and which are not listed among the objectives for this unit?

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11. If you consider that modifications of the unit would improve the unit, what modifications would you suggest?

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12. If it were possible to consider certain extensions of the unit, what extensions would you suggest?

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Office use only

13. Below is a list of things which student teachers have indicated are important to them:

Consider each statement in turn, and indicate the extent to which you consider that the unit is likely to contribute to the satisfaction of the student need expressed in the statement.

	Statement of student teacher need	Extent to which unit is likely to contribute to satisfaction of the need			
		Not at all or to a negligible extent	To some extent	To a substantial extent	
13. 1	To feel that they will, in fact, cope in the classroom	☐ 1	☐ 2	☐ 3	☐ 18
13. 2	To explore their own capabilities	☐ 1	☐ 2	☐ 3	☐ 19
13. 3	To feel they have achieved success (by their own standards)	☐ 1	☐ 2	☐ 3	☐ 20
13. 4	To have new or fresh experience	☐ 1	☐ 2	☐ 3	☐ 21
13. 5	To sort out or express their own ideas or opinions	☐ 1	☐ 2	☐ 3	☐ 22
13. 6	To be liked, to get on with others	☐ 1	☐ 2	☐ 3	☐ 23
13. 7	To help and be helped	☐ 1	☐ 2	☐ 3	☐ 24
13. 8	To feel that their own contribution is appreciated by others (method, staff, peers, etc.)	☐ 1	☐ 2	☐ 3	☐ 25
13. 9	To see themselves more clearly as teachers	☐ 1	☐ 2	☐ 3	☐ 26
13.10	To feel they have gained practical teaching skills	☐ 1	☐ 2	☐ 3	☐ 27
13.11	To feel they have developed relevant understanding of children	☐ 1	☐ 2	☐ 3	☐ 28
13.12	To feel they have developed relevant understanding of science	☐ 1	☐ 2	☐ 3	☐ 29

14. Any other comments on the unit?

(Could you also make comments about any special comments that the unit developers may have requested at the end of the unit)

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(Please attach separate sheet if insufficient room)

☐☐☐☐ 30 31 32 33

Name: _____ Date: _____

Institution: _____

Address: _____

_____

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Please return this form by July 31 to: Dr. Lindsay D. Mackay, Faculty of Education, Monash University, CLAYTON, VICTORIA, 3168